

Autologous Subcutaneous Platelet-Rich Plasma in the Management of Non- Healing Trophic Ulcer in Leprosy

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Trophic ulcers in leprosy patients are one of the commonest causes of disability and deformity. The management of trophic ulcers poses a great challenge to the dermatologists/ surgeons/ leprologists and the search for more effective therapeutic management continues. Platelet-rich Plasma (PRP) has been found to accelerate skin wound healing and promote re-epithelialization and its role in the management of chronic leg ulcer has been reported with satisfactory results. We report two cases of non-healing trophic ulcers in leprosy patients treated with subcutaneous PRP that had shown poor response to conventional treatment and showed improvement with subcutaneous PRP injections.

Keywords : Platelet-Rich Plasma, PRP, Leprosy, Trophic Ulcers, Healing

Introduction

Trophic ulcers are chronic ulcers which mostly occur on bony prominences due to underlying disease, sensory loss, or vascular injury. Trophic ulcers in leprosy patients are one of the commonest causes of disability and deformity and occur in about 5% to 20% of patients (Shravani et al 2022). These are recurrent in nature and show poor response to the conventional treatment for ulcers (Puri et al 2012, Nagaraju et al 2017). Thus, management of such trophic ulcers poses a great challenge to the dermatologists/ surgeons/ leprologists and the search for more effective therapeutic modality continues. Platelet-rich plasma (PRP) accelerates and stimulates wound healing through the degranulation of alpha granules in platelets and

subsequent secretion of various growth factors (GF), such as platelet-derived GF, epidermal GF, vascular endothelial GF, HGF, fibroblast GF and TGFb, which have been documented to be involved in the process of wound healing (Chicharro-Alcántara et al 2018, Suryanarayan et al 2014). Potential efficacy and safety have been demonstrated in the management of chronic non-healing ulcers of different aetiologies treated with subcutaneous autologous PRP injections together with topical application of PRP gel (Suryanarayan et al 2014). We report two cases of non-healing trophic ulcer inpatients of leprosy treated with subcutaneous PRP that showed minimal response to conventional treatment and showed improvement with subcutaneous PRP injections.

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Case 1:

A 36-year-old female diagnosed case of borderline tuberculoid leprosy with grade 2 disability who had completed her multidrug therapy 4 years ago came with complain of non-healing ulcers in her right foot for ten months. The ulcers were painless and were increasing in size. She denied a history of diabetes mellitus and hypertension. On examination there were two complicated ulcers with presence of slough, one present between the base of third and fourth toe measuring 0.5a x 0.5 x 0.1 cm and other linear ulcer measuring 2.5 cm x 1 cm x 1 cm present on the upper plantar aspect of right foot. However, underlying structures were not adhered. The floor of the ulcer was pale with scanty discharge, surrounding skin was normal with loss of sensation. Ulcer showed little improvement after repeated courses of oral antibiotics, topical medication, and saline dressings. The patients also underwent debridement of slough but with little improvement.

Second case was a 33-year-old male diagnosed case of lepromatous leprosy with grade 2 disability who had completed his multidrug therapy 5 years ago came with history of non-healing ulcer in his right foot for 1 year. He had no history of diabetes and hypertension. Patient had already taken treatment for the same with no improvement. On examination a complicated ulcer was present on the heel of right foot measuring 3.5 cm x 1 cm x 1 cm in size with pale floor and base. Surrounded skin was hyperpigmented and hyperkeratotic with loss of sensation. Underlying structures were adhered, and the floor of the ulcer was pale with scanty discharge. There was no improvement even after repeated courses of oral antibiotics, topical medication, saline dressings, and plaster cast.

Routine hemogram, blood glucose, kidney function tests, and liver function tests recorded at baseline were normal in both cases. Gram

staining of the material from the base of ulcer was negative and fungal culture showed no growth.

Both the patients were diagnosed to have trophic ulcers due to leprosy. Ulcers showed little improvement after repeated courses of oral antibiotics, topical medication and saline dressings. The patients also underwent debridement of slough but with little improvement. Off-loading the weight of the patient with the help of bed rest, plaster cast, advice regarding gait change and modified footwear was also done before commencement of PRP treatment. Ulcers were treated with subcutaneous injection of PRP every two weeks.

The percentage reduction in ulcer surface area recorded at every follow-up visit by the same assessing clinician, prior to application of platelet-poor plasma gel and PRP injection was used as a primary effectiveness parameter.

Autologous platelet-rich plasma was made by using double centrifugation technique. After cleaning the area with betadine solution, PRP was injected intra and peri-lesionally, in the margin and base of ulcer using a 2ml syringe fitted with IM needle with 1 cm distance from the site of the previous injection. Platelet-poor plasma was also applied topically over the lesions. After procedure, the ulcer was closed with sterile gauze until the next PRP treatment. The clinical result showed that the ulcer completely healed in six weeks of PRP treatment in case -1, with no side effect during treatment. (Figs. 1 a, b, c, d).

In case-2, partial healing of ulcer was seen at six weeks of PRP treatment and complete epithelialisation of the skin ulcer was observed at 9 weeks (Figs. 2 a, b, c, d). As the wound size decreased, there was decrease in injected area also.

No signs of recurrence were observed 1 month after the cessation of the treatment in both



Fig. 1 : Patient's follow-up images depicting the treatment efficacy of PRP during follow-up period. (1a: Clinical aspect of the two trophic ulcer over plantar aspect of foot in patient 1, on Day 1, before initiation of treatment with PRP injections; 1b: Partial healing of plantar ulcer on 14th day by platelet rich plasma; 1c: Progressive healing of plantar ulcer on 28th day by platelet rich plasma; 1d: Partial to complete healing of ulcer by 42 days with platelet rich plasma).

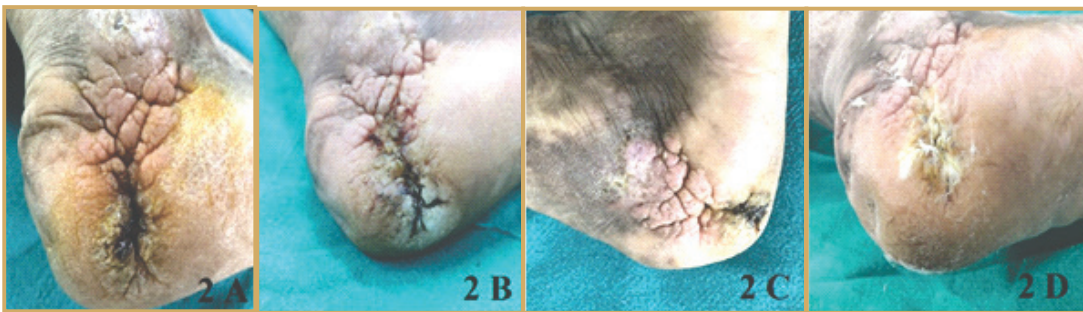


Fig. 2 : Follow-up of deep trophic ulcer on the lateral malleolus in patient 2 (2a: Clinical aspect pre-treatment; 2b: Partial healing of ulcer within 14 days by platelet rich plasma; 2c: Progressive healing of ulcer within 28 days by platelet rich plasma; 2d: Complete healing of plantar ulcer within 42 days by platelet rich plasma; Fairly complete reepithelialisation at 8 weeks of platelet rich plasma).

cases. Ulcers started healing within 2 weeks, the surface area of ulcers decreased significantly from first followup onward in both the patients and this was maintained till the third followup. There was no significant occurrence of adverse events during treatment.

Discussion

Trophic ulcer is defined as a pressure ulcer caused by external trauma to a part of the body that is in poor condition because of disease, loss

of afferent nerve fibres or vascular insufficiency. Trophic ulcers in leprosy patient pose a great challenge to the treating dermatologists / surgeons /leprologists as it is a recurrent and recalcitrant problem (Puri et al 2012).

PRP plays a major role in the process of wound healing. It accelerates the process of wound healing due to release of various growth factors (GFs) (Chicharro-Alcántara et al 2018). These include platelet-derived GF, fibroblast

GF, vascular endothelial GF, epidermal GF, insulin-like GF, and transforming GF. These GFs hasten the process of healing by stimulating the process of angiogenesis, cell proliferation and differentiation resulting in tissue regeneration and reepithelialisation. Activated platelets release large amounts of substances that play an important role in primary homeostasis, including serotonin, catecholamines, fibrinogen, fibronectin, factor V, factor VIII (Von Willebrand factor), thromboxane A₂ and calcium (Arshdeep & Kumaran 2014, Anandan et al 2016). Conde-Montero et al (2016) have reported improvement of trophic ulcer in leprosy by treating the ulcer weekly with intralesional PRP. Suryawati et al (2019) treated a case of trophic ulcer with a combination of injection and topical PRP with one-week interval and notice ulcer healed completely in four weeks of PRP treatment. Anandan et al (2016) studied the efficacy and safety of PRP in the healing of trophic ulcers secondary to leprosy in 50 patients, they observed 46 patients (92%) showed complete healing. In 4 patients (8%), there was marked reduction in wound size with partial re-epithelization. and in 88%, complete healing was seen after the fourth sitting. Mean time for ulcer healing was around 4.38 weeks. We treated two cases of non-healing trophic ulcers in leprosy with subcutaneous PRP every two weeks and the ulcers healed in 6 weeks with no side effects during treatment. Because the patients had long-standing ulcers that had not responded to any form of treatment, it was for the first time following PRP, the ulcers showed signs of healing and a reduction in the size. Hence, it may be inferred that PRP contributed to the healing.

Conclusion

PRP, as an additional treatment modality could be a simple, safe, cost effective and emerging therapeutic approach in the treatment of trophic

ulcers due to leprosy. It seems to expedite the healing of the ulcer, thus improving the quality of life of leprosy patients and reducing the societal stigma. These benefits need to be established by conducting well designed RCTs with adequate sample sizes.

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