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Platelet-rich fibrin (PRF) as modalities therapy of venous ulcer



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ABSTRACT

Introduction: Stasis/venous ulcers are defined as ulcers which do not completely heal within 3 months and generally occurred over the age of 40 years or younger. Conventional treatment requires a long period of time. New therapy using platelet-rich fibrin (PRF) can accelerate healing.

Case: A serial cases of venous ulcers. The first case, a 17-year-old woman, was diagnosed with the right leg venous ulcer for 6 months, was treated with PRF every week and wound closure occurred at the 4th week. The second case was an 85-year-old man, diagnosed with venous ulcer at right pedis since 7 years ago, and was treated with PRF. The wound healed within seven weeks.

Discussion: Stasis ulcers are chronic ulcers that sometimes require

long hospitalization and prolonged treatment, and it affects the socio-economic and quality of life of the patients. Platelet-rich fibrin (PRF) is autologous blood that is rich in fibroblast growth factor (FGF), vascular endothelial growth factor (VEGF), platelet-derived growth factors (PDGFs), transforming growth factor-beta (TGF- β), epidermal growth factor (EGF), and insulin-like growth factor-1 (IGF-1) which can help accelerate wound healing without hospitalization. This method has been carried out in several countries, with wound healing occurred at week 15th.

Conclusion: There have been 2 reported cases of venous ulcers treated with PRF and achieved wound healing after 4 weeks (first case) and 7 weeks (second case) of therapy.

Keywords: stasis ulcer, platelet-rich fibrin, growth factor, outcome

Cite this Article: Rusyati, L.M.M., Suryawati, N.N., Karmila, I.G.A.A.D. 2019. Platelet-rich fibrin (PRF) as modalities therapy of venous ulcer. *IJBS* 13(2): 106-108. DOI:10.15562/ijbs.v13i2.222

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INTRODUCTION

Chronic ulcers are defined as sores in the leg area that do not show recovery after 3 months of treatment or are still not recovering after 12 months.¹ Commonly, leg ulcers are caused due to abnormalities of the veins, abnormalities of the arteries, neuropathy, and malnutrition.^{2,3} Venous ulcers or static ulcers, is one of the most common variants of chronic ulcers.^{1,2} Venous ulcers are the most common cause of lower limb ulcers, about 1% at the age of under 65 years and increase to 4% when seen at 65 years.^{3,4} Venous ulcers can affect the quality of life of the patient both in socio-economic and social.^{1,2,3}

Management of venous ulcers and other chronic ulcers includes; debridement, use of wound-dressing, infection control, off-loading of localised pressure, overcoming malnutrition conditions, and reconstructive surgery.^{3,4} If the ulcer does not respond to standard therapy, advanced therapy can be given, one of them is by applying topical growth factors. Platelet-rich fibrin (PRF) as one of the newest modalities being developed at present.^{4,5}

Platelet-Rich Fibrin comes from autologous blood and is a second-generation platelet-

concentrate containing Fibroblast Growth Factor (FGF), Vascular Endothelial Growth Factor (VEGF), Platelet-Derived Growth Factors (PDGFs), Transforming Growth Factor Beta (TGF- β), Epidermal Growth Factor (EGF), and insulin-like Growth Factor-1 (IGF-1) which are reported to be helpful in accelerating wound healing.

Following were reported several cases of venous ulcers treated with PRF. These cases were reported to increase knowledge about the benefits and results of PRF therapy in venous ulcers.

CASE

Case I: A 17-years-old woman, complained of wound, filled with pus on the right ankle since 6 months ago. The patient was treated with debridement. However, no improvement was noted. Wound culture was performed, showed *Pseudomonas aeruginosa*. Doppler ultrasound examination was performed, showed right inguinal chronic venous hypertension. The patient was diagnosed with the venous ulcer over the right leg. Patient was given antibiotic and chlorhexidine compress topically. After infection was resolved, patient was then treated with PRF once a week. In

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the fourth week, improvement was noted, wound closed and decrease in size (Figure 1a-1c).

Case II: An 85-years-old male came with chief complain of wound over his right foot since 7 years prior to consult. Lesion initially started with small wound, which increases in size overtime. This lesion disrupted the patient's activities. Upon consultation, doppler ultrasound was performed, showing bilateral chronic venous insufficiency accompanied by slow flow arterial disease. The patient was diagnosed with varicose vein over the right foot. Debridement of the lesion was then performed. Patient was given PRF therapy once a week, which showed improvement on the 7th week (Figure 2a-2f).

DISCUSSION

Venous ulcers are generally located in the medial malleolus. This ulcer is a chronic ulcer that is difficult to cure.^{1,3} Some risk factors for venous ulcers are age, female sex is more common than

men, obesity, trauma, standing for a long period of time, congenital abnormalities of blood vessels that are most often caused by venous hypertension, deep vein thrombosis (DVT), phlebitis and blood clotting factor abnormalities.³

Seventy percent of clinical manifestations of venous ulcers are characterized by the location of the ulcers in the medial area of the ankle, superficial, irregular border, wound base is covered by of granulation tissue, swelling, exudate, allergic reaction, may presents, lipodermatosclerosis characterized by changes in skin colour such as erythema and hyperpigmentation, pain that decreases when legs are elevated.⁴ The above symptoms are not found in ulcers due to arterial disorders, which the pain are felt continuously.⁵

In both cases, the history showed complaints of trauma to the lower limbs that did not heal for more than 3 months. Physical examination revealed a solitary ulcer. Investigations conducted with Doppler ultrasound in both cases found venous disorders, based on this examination the first and second cases were diagnosed with venous ulcers.

The main target in the treatment of ulcer therapy is wound closure. Treatment for venous ulcer therapy is still a challenge because ulcers tend to be difficult to heal with conventional treatment and when using other modern modality require more expensive costs and a longer period of time, so there's a need for other therapeutic modalities for this condition. Platelet-rich fibrin (PRF) is a promising therapy for wound closure. Platelet-rich fibrin was first developed in France by Choukroun and colleagues in 2001 and is used in oral surgery therapy. Then began to be developed as a therapeutic modality for ulcers since 2004.⁵ In several studies, the application of PRF has been reported to be effective in accelerating healing time in ulcers.^{4,5,6}

Platelet-rich fibrin (PRF) is autologous blood which is rich in growth factors which can help in accelerating wound healing. In terms of cost, the PRF does not use large costs and in terms of technical PRF does not require special skills so that it can be applied easily and have promising result. The protocol for making platelet fibrin is quite simple, by taking blood around 5 ml and centrifuged at a speed of 3000 rpm for 10 minutes. Then 3 layers will be formed, the second layer is rich in fibroblast growth factor (FGF), vascular endothelial growth factor (VEGF), platelet-derived growth factors (PDGFs), transforming growth factor-beta (TGF- β), epidermal growth factor (EGF), and insulin-like growth factor-1 (IGF-1). This method is widely used in some countries for the treatment of acne scars, ageing and ulcers without side effects. Besides PRF also contains fibrin, fibronectin and

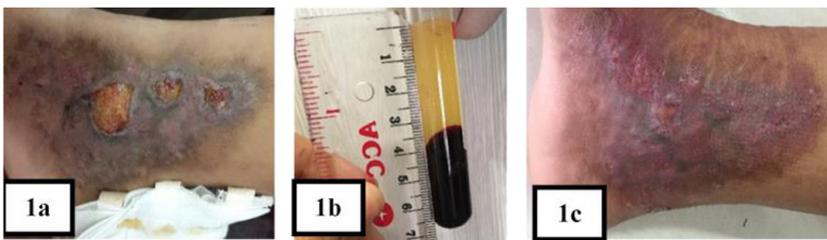


Figure 1a. Ulcer upon first consultation.

Figure 1b. PRF result after centrifugation.

Figure 1c. Improvement of ulcer on the 4th week of treatment.

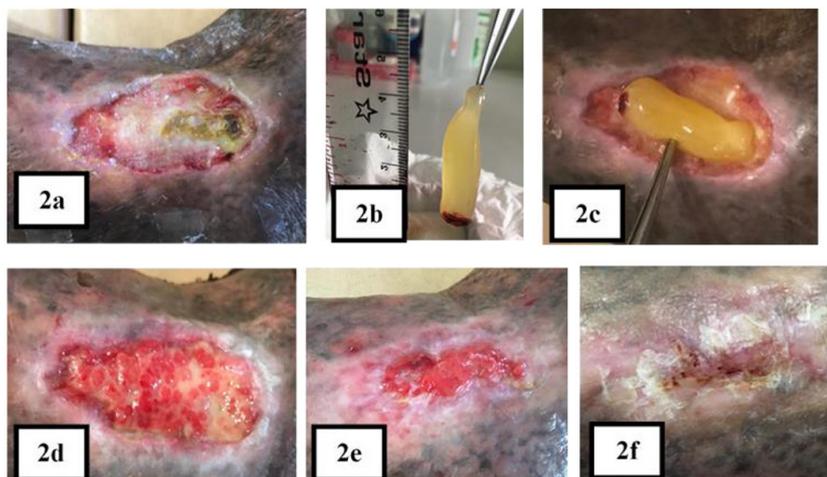


Figure 2a. Ulcer upon first consultation.

Figure 2b & c. PRF was placed on the ulcer,

Figure 2d. Follow up after 3rd week showed healing of the ulcer.

Figure 2e. Follow up after 6th week.

Figure 2f. Follow up after 7th week showed closure of the ulcer.

vitronectin, and 65% of leukocytes. All the content provided in the PRF causes PRF to be the best blood product that can help speed up the wound healing process compared to other blood products.^{7,8}

There are several procedures before the application of PRF on ulcers, debridement of the ulcer should be done first then followed by rinsing it with saline solution, and then the application of PRF on the ulcer covered with sterile gauze and elastic bandages. Another study by Anirudh et al. which compared chronic venous ulcer therapy with PRF and chronic venous ulcer therapy with saline dressing reported a size reduction of 85.51% in the ulcer area at the end of the fourth week in ulcers treated with PRF.⁶ If there is an evidence of infection in the ulcer it is recommended to treat the infection first, then PRF therapy can be done. This method of applying topical PRF is carried out every week.⁵ Study by Nelson et al. in 32 cases of ulcers whose PRF therapy was reported every 17 patients with ulcers of size 10cm² closes within 9 weeks and 15 patients with ulcers of size 10cm² experience healing within 15 weeks.⁹

In both cases before the application of PRF, wound cleaning is done with debridement. In the first case there is a secondary infection so the infection is treated first before starting PRF therapy. In both cases the application of PRF is given every week until the wound heals. In the first and second cases there is clinical improvement by wound closure. In the first case wound closure occurs at week 4 and in the second case wound closure occurs at week seven.

CONCLUSION

We have reported a serial cases of venous ulcer that are treated with platelet-rich fibrin (PRF). The diagnose is based on history taking, physical examination and laboratory test. While in the observations we obtained improvements in the form of wound closing. The wound in the first case heals

after 4 weeks and in the second case the healing of the wound occurs 7 weeks post-treatment.

CONFLICT OF INTEREST

Author declares there is no conflict of interest

PUBLICATION ETHICS

All patient had received signed inform consent regarding publication of their respective photograph in journal article

REFERENCE

1. Sasanka CS. Venous ulcers of the lower limb: where do we stands. *Indian Journal of Plastic Surgery*. 2012;45(2):266-274.
2. Puri V, Venkateshwaran N, Khare N. Tropic Ulcers – Practical Management Guidelines. *Indian J Plast Surg*. 2012;45(2):340-351.
3. Kahle B, Hermanns HJ, Gallenkemper G. Evidence-based treatment of chronic leg ulcer. *Deutsches Arzteblatt International*. 2011;12:231-237.
4. Valencia IC, Falabella A, Kirsner RS, Eaglstein WH. Chronic venous insufficiency and venous leg ulceration. *J A Acad Dermatol*. 2001;44(3):401-21.
5. Walsh N, Santa D. Lipodermatosclerosis: A Clinicopathology of 25 Cases. *Journal of the American Academy of Dermatology*. 2010;62(6):1005-1012.
6. Norman G, Wetsby MJ, Rithalia AD, Stubbs N, Soares MO, Dumville JC. Dressings and topical agents for treating venous leg ulcers. *Cochrane Database Syst Rev*. 2018;2018(6):CD012583.
7. Giannini S, Cielo A, Bonanome L, Rastelli C. Comparison between PRP, PRGF, and PRF: light and shadows in three similar but different. *European review for medical and pharmacological sciences*. 2015;19:927-930.
8. Dohan Ehrenfest DM, Bielecki T, Mishra A, Borzini P, et al. In Search of a consensus for surgical use: PRP, PRF, fibrin gel polymerization and leucocytes. *Curr Pharm Biotechnol*. 2012;13:1131-1137.
9. Nelzen O. Prevalence of Venous Leg Ulcer: The Important of Data Collection Method. *Phlebolympology*. 2018;15(4):143-149.



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