(International Print/Online Journal)

SJIF IMPACT FACTOR: 5.565
PUBMED-National Library of Medicine ID-101739732

ISSN (Print): 2209-2870
ISSN (Online): 2209-2862

International Journal of Medical Science and Current Research (IJMSCR)
Available online at: www.ijmscr.com
Volume 4, Issue 6, Page No: 779-785
November-December 2021

IJMSCR

Efficacy of Autologous Platelet Rich Fibrin In Trophic Ulcers

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Type of Publication: Original Research Paper
Conflicts of Interest: Nil

Abstract

Trophic ulcers a pressure ulcer caused by external trauma to a part of the body that is in poor condition because of disease, vascular insufficiency or loss of afferent nerve fibres. Platelet rich fibrin (PRF) is one of the newer modalities and it contains fibroblast growth factor, vascular endothelial growth factor and platelet derived growth factor which enhances wound healing. It is a prospective study to demonstrate the efficacy of autologous platelet rich fibrin in trophic ulcers

Keywords: Platelet rich fibrin(PRF)

Introduction

The word 'Trophic' is derived from the Greek word Trophe = nutrition. The American Heritage Medical Dictionary 2007 defines trophic ulcers as 'an ulcer due to impaired nutrition of the part'. Mosby's Medical Dictionary 2009 defines trophic ulcer as 'a pressure ulcer caused by external trauma to a part of the body that is in poor condition because of disease, vascular insufficiency or loss of afferent nerve fibres'. Trophic ulcer can be of neuropathic, vascular (venous, arterial), systemic causes or malnutrition.[1]Standard treatment algorithm includes complete patient and wound assessment, history, physical examination, and variety of diagnostic test that determine the need for infection control, debridement. The treatment is often difficult and is generally associated with high recurrence rates[2,3,4].The aim of the study is to determine the efficacy of PRF in trophic ulcers.

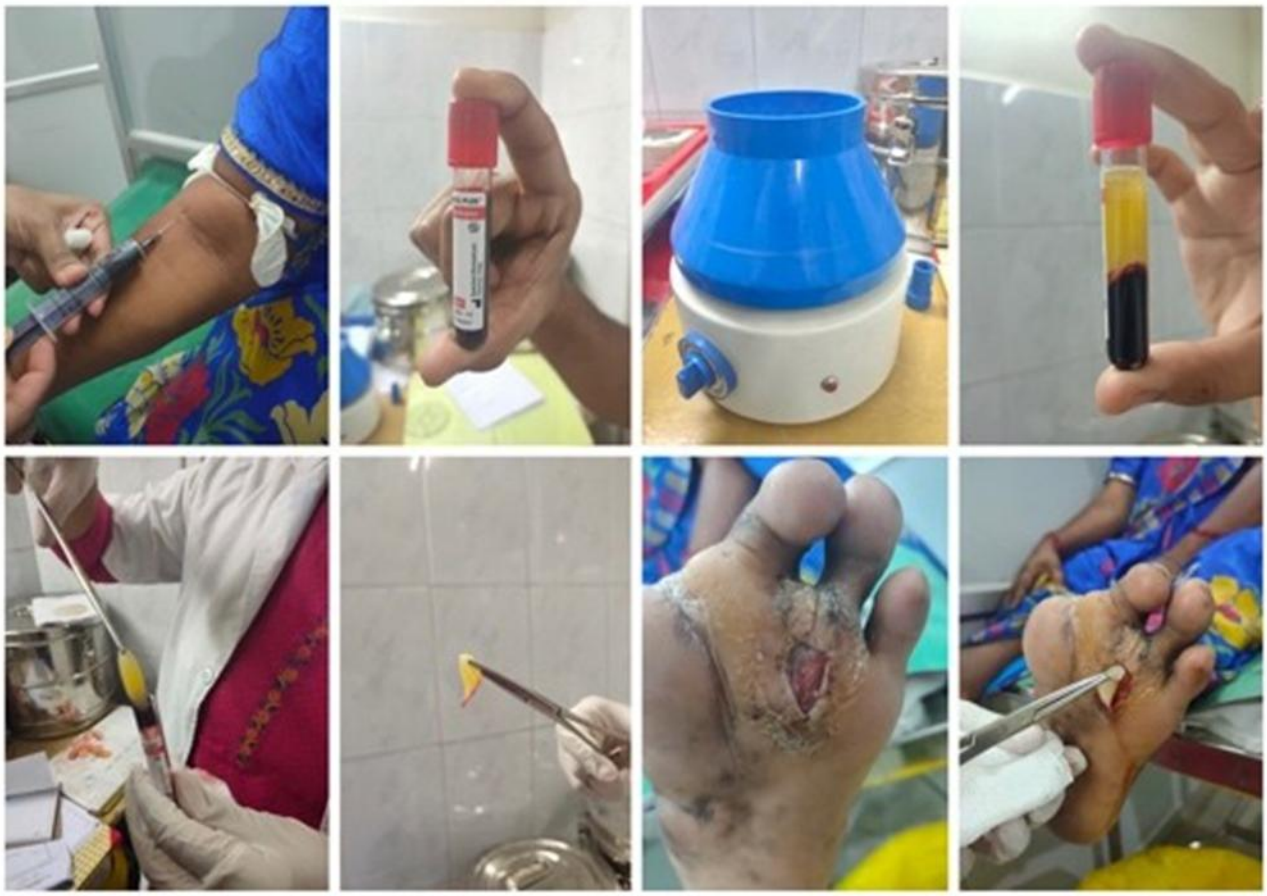
Methods

This is a prospective study to study the efficacy of PRF in epithelialization and wound reduction in trophic ulcers. 62 cases were compiled in this study.

Inclusion Criteria- Age group of 18 to 80 years with trophic ulcers and patient Hb%>10gm/dl.

Exclusion Criteria- Patients with known or suspected osteomyelitis, presence of cellulitis, peripheral vascular disease (inadequate perfusion), ischemia, gangrene and patient not willing for study.

Preparation Of Material- Under strict aseptic conditions 20ml of venous blood drawn and added to red coloured vacutainer which contains clot activator. In first spin the tube is centrifuged at 5000rpm for 15 min to separate red blood cells from platelets and plasma. After 1st spin 3 layers appeared. Bottom of the tube contains Red blood cells, middle layer contains buffy coat, which contains platelets and leukocytes, upper phase contains clear solution of platelet poor plasma. Again it is centrifuged at 2000rpm for 5-10 min[5].



Dressing Technique- Ulcer cleaned with normal saline. PRF prepared from patient blood and injected into the edge of the ulcer and fibrin plug is placed directly on the ulcer. The dressing is kept for a period of 3-4 days depending on the wound.This is repeated every week for a period of 6 weeks.

RESULTS

Out of 62, 12 patients were excluded in the

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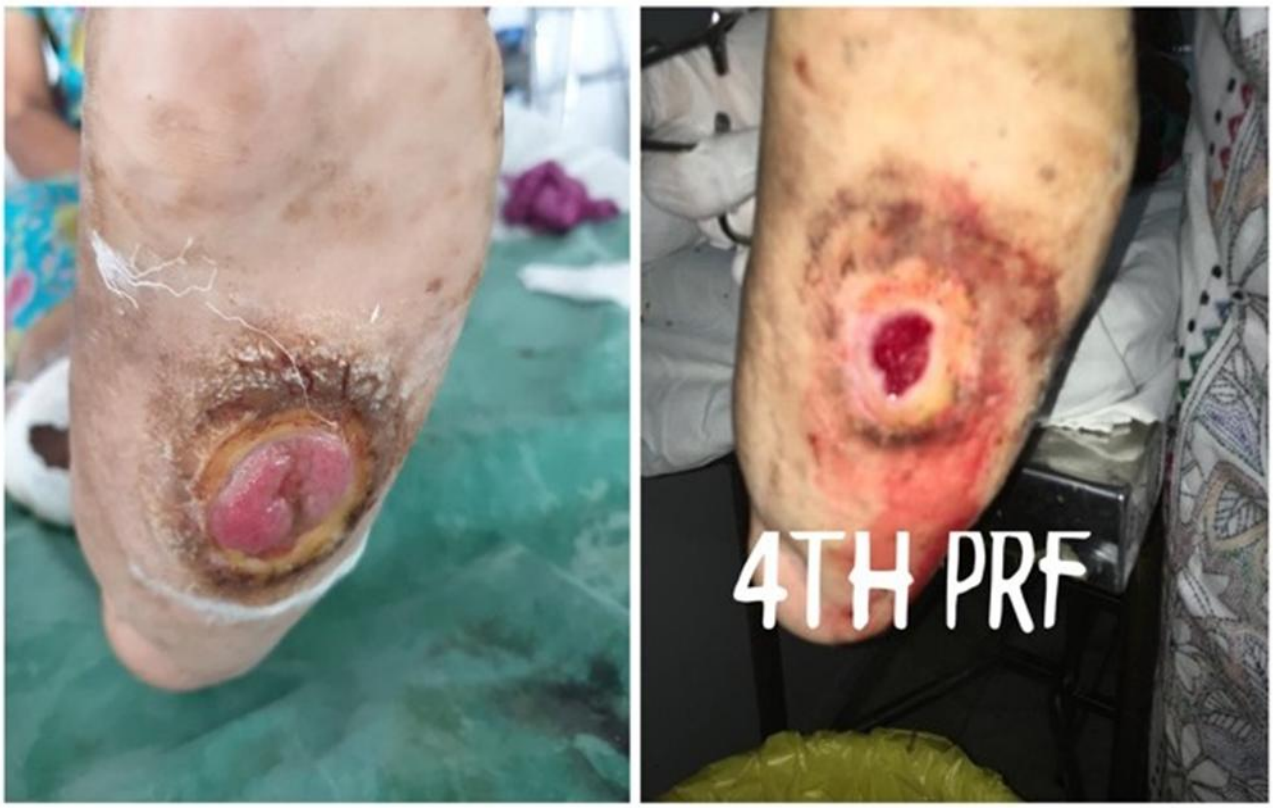

Out of 12 patients 4 were anaemic, 3 had proven osteomyelitis, 2 had cellulitis of that limb, 2 patient not willing for the study, 1 had peripheral vascular disease.

Age distribution and aetiology of ulcers

Age	No.of cases
18-35 yrs	9
36-50 yrs	15
51-65 yrs	15
66-80 yrs	11

	Location of ulcer	Area	1 s t PRF	2 n d PRF	3 r d PRF	4 t h PRF	5 t h PRF	6 t h PRF
1	Heel of rt foot	5cm	5	4	3	1	0.5	
2	Heel of lt foot	4cm	4	3.5	3.5	3	2	1.5
3	Rt heel	3cm	2.5	2	2	1.5	1	
4	Base of 2nd metatarsal of lt foot	2cm	1	0.5				
5	Heel of rt foot	2cm	1	0.5				

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6	Sole of lt foot	5cm	4	3.5	2.5	2	0.5	
7	Sole of lt foot	4cm	3	3	2.5	2	1	
8	Sole of rt foot	3cm	2.5	1.5	1	0.5		
9	Sole of lt foot	2cm	1.5	0.5				
10	Sole of rt foot	4cm	2.5	2	1	0.5		
11	Heel of lt foot	2cm	2	1.5	1.5	1.5	1	1
12	Base ofRt great toe	2cm	1.5	1	0.5			
13	B a s e o f 5thmetatarsal	3cm	2	1.5	0.5			
14	Heel of rt foot	5cm	4.5	4	3	2.5	2	1
15	Heel of lt foot	2cm	1.5	0.5				
16	Heel of lt foot	3cm	2	1.5	1.5	1	1	
17	Heel of lt foot	4cm	4	3.5	2.5	2	1.5	1
18	Heel of lt foot	6cm	5.5	5	4	3.5	2.5	1
19	Heel of rt foot	4cm	3.5	2.5	2.5	2	2	1.5
20	Heel of rt foot	5cm	5	4.5	3.5	3	1	
21	Base of lt great toe	4cm	3	2	1	0.5		
22	Base of 2nd rt metatarsal	2cm	2	1.5	1	0.5		
23	Sole of lt foot	4cm	3	2	1.5	1	0.5	
24	Heel of lt foot	5cm	4	3.5	3	2	1	
25	Heel of rt foot	6cm	4.5	3.5	2.5	1.5	0.5	
26	Heel of rt foot	4cm	4	3	2	1	0.5	
27	Heel of lt foot	4.5cm	4	3.5	2.5	1.5	0.5	
28	Base of 3rd rt metatarsal	4cm	3	2	1	0.5		
29	Base of 2nd rt metatarsal	3cm	2	2	1	0.5		
30	B a s e o f r t disarticulated great toe	2cm	2	1.5	1	0.5		
31	Heel of rt foot	6cm	5	4	3	2	1	
32	Heel of lt foot	4cm	3.5	3.5	2.5	2	1	

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33	B a s e o f r t great toe	2cm	1	0.5				
34	Base of lt great toe	3cm	2	1				
35	Base of 3rd rt metatarsal	3cm	2.5	2	1.5	1	0.5	
36	B a s e o f disarticulated rt 2nd toe	3cm	2	1	1	0.5		
37	Heel of rt foot	5cm	4	3	2	1	0.5	
38	Heel of lt foot	5.5cm	4.5	4	3	2	1	
39	Base of 3rd rt metatarsal	3.5cm	3	2.5	2	1	0.5	
40	B a s e o f r t great toe	2.5cm	2	1.5	1	0.5		
41	Heel of lt foot	5cm	4	3	2	1	0.5	
42	Heel of lt foot	4cm	2	1	0.5			
43	Heel of rt foot	5cm	3.5	2.5	1.5	0.5		
44	Heel of rt foot	5cm	4	3	2	1		
45	Base of 2nd rt metatarsal	2cm	1					
46	B a s e o f disarticulated rt great toe	3cm	2.5	2	1.5	1	0.5	
47	Base of 2nd lt metatarsal	2cm	1	0.3				
48	Heel of rt foot	4cm	3	2	1	0.5		
49	Heel of lt foot	3cm	2.5	2	1.5	1	0.5	
50	Heel of rt foot	2cm	1	0.5				

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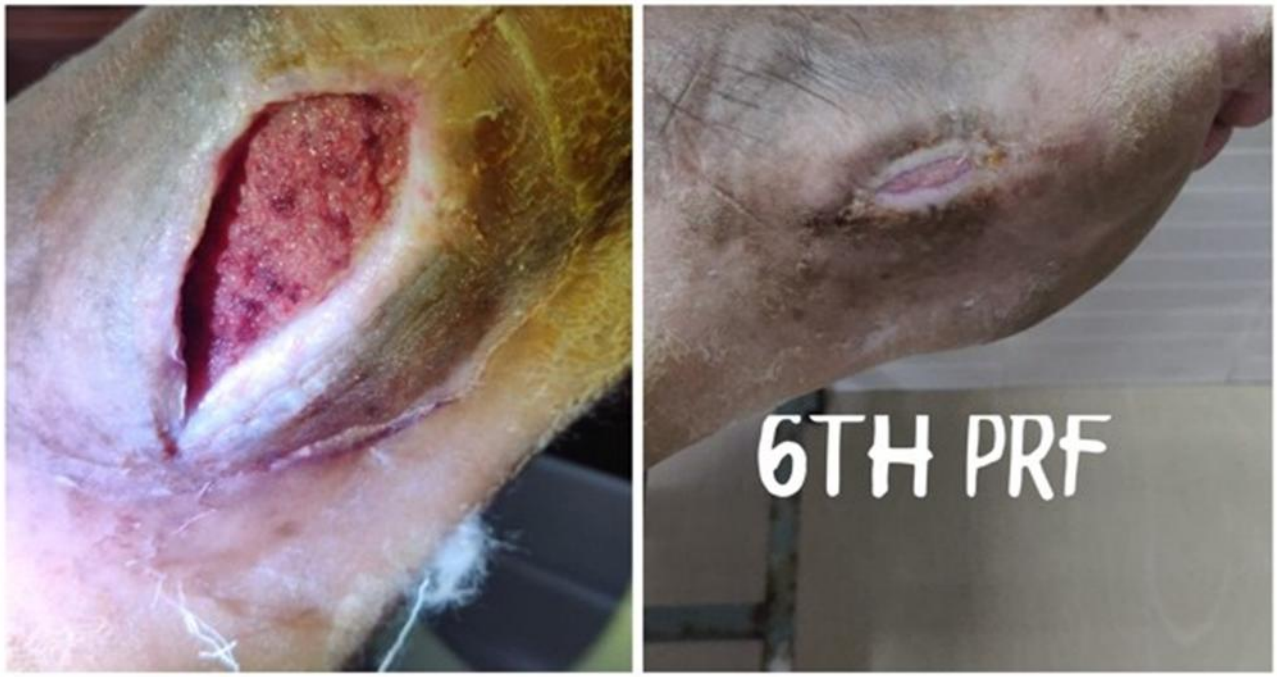

Discussion

Plantar ulcer is the most common disability. By shortening the wound healing phase the quality of life of these patients can be improved. Platelet rich fibrin(PRF) is an autologous platelet and leucocyte rich fibrin material and is an important advancement in regenerative medicine. It forms an organised network where the platelets and leukocytes are concentrated leading to sustained release of various growth factors resulting wound healing. Hence it can be used in the treatment of venous ulcers[6].

PRF was first developed by Choukroun et al.[7] in France for use in oral and maxillofacial surgery. PRF belongs to new generation of platelet concentrates with simplified preparation . This technique neither requires anticoagulant nor bovine thrombin(nor any other gelling agent). It is just centrifuged blood without any addition. The absence of anticoagulant implies the activation in few minutes. Fibrinogen is initially concentrated in higher part of the tube, before thrombin transforms it into fibrin clot, which is concentrated in middle of the tube, just between the red corpuscles at the bottom and acellular plasma at top. Platelets are theoretically trapped in fibrin meshes.

A study conducted by Margolis et al. Which included 26,599 patients, concluded that patients who are treated with products derived from platelets, tend to heal faster than patients who are treated without the products derived from platelets. He also concluded that even though the ulcers that were treated with these derivatives were bigger and deeper than the other groups, these showed better improvement at the end of 12 weeks[8].

In another study, Anita et al. Showed that healing increased significantly with the help of PRF. She also concluded that it not only helps in supplying the required GF's but also by forming fibrin matrix which helps in cell migration, it also helps in neovascularization[9].

Mechanism of action of platelet rich fibrin It functions as a tissue sealant and platelets initiate the wound repair by releasing locally acting growth factor via alpha granules degranulation.

Alpha granules of platelet contains platelet derived growth factor, transforming growth factor, interleukin-1, platelet derived angiogenesis factor, epithelial cell growth factor, insulin like growth factor, osteocalcin, osteonectin, fibrinogen factor and thrombospondin-1.

These growth factors help in healing by attracting undifferentiated cells in Newley formed matrix and triggering cell division. PRF may suppress cytokines release and limit inflammation, interacting with macrophages to improve tissue healing and

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regeneration and promote new capillary growth ad accelerate epithelialization in chronic wounds[10].

Conclusion

We would like to conclude that the use of PRF dressings as an adjuvant therapy in treatment of trophic ulcer of lower limbs shows great potential to achieve complete closure of ulcers and can be successfully be used as a routine procedure in the management. Out of 50 patients 45 patients has completely healed. This procedure is simple, patient friendly, cost effective, painless and can be performed as an out patient procedure.

References

1. Puri V, Venkateswaran N, Khare N. Trophic ulcers-Practical management guidelines. Indian J Plast Surg. 2010;45(2):340-351.doi:10.4103/0970-0358.101317
2. Bergqvist D, Lindholm C, Nelzen O. Chronic leg ulcers: The impact of venous disease. J Vasc surg. 1999;29:752-5.
3. Evans CJ, Fowler's FG, Ruckley CV, Lee AJ. Prevalence of varicose veins and chronic insufficiency in men and women in the general population: Edinburgh Vein Study. J Epidemiol Community Health. 1999; 53:149-53.
4. Mayer W, Jochmann W, Partsch H. Varicose ulcer: healing in conservative therapy. A prospective study. Wein Med Wochenschr. 1994; 144:250-2.
5. Sampson S, Gerhardt M, Mandelbaum B. Injection grafts for musculoskeletal injuries: a review. Curr Rev Musculoskelet Med. 2008;1:165-74.
6. O'Connell SM, Impeduglia T, Hessler K, Wang XJ, Carroll RJ, Dardik H. Autologous platelet rich fibrin matrix as a stimulator of healing chronic lower extremity ulcers. Wound Repair Regen. 2006;14:A76.
7. Choukroun J, Adda F, Schoeffler C, Vervelle A. An opportunity in perio-implantology(in French): The PRF. Implantodontine. 2001; 42;55-62.
8. Margolis DJ, Kantor J, Santana J, Strom BL, Berlin JA. Effectiveness of platelet releasable for the treatment of diabetic neuropathic foot ulcers. Diabetic Care. 2001;24:483-8.
9. Anita E, Sanchez M, Nurden AT, Zalduendo M, de la Fuente M, Orive G, et al. Autologous fibrin matrices: A potential source of biological mediators that modulate tendon cell activities. J Biomed Mater Res A. 2006;77:285-93.
10. Knighton DR, Doucette M, Fiegel VD, Ciresi K, Butler EL, Austin L. The use of platelet derived wound healing formula in human clinical trails. Prog Clinton Biol Res. 1988;266:319-29.

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