IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 20, Issue 10 Ser.6 (October. 2021), PP 01-04
www.iosrjournals.org

A Comparative Study Of Efficacy Of Antibiotic Impregnated Collagen Granules Dressings Vs Platelet Rich Fibrin Dressings For Treatment Of Trophic Ulcers.

Dr.Durvasula.A.N.Maithili[1], Dr.Mahalakshmi peruri[2], Dr.Kiranmai mudapaka
[1]*(Department of DVL, Siddhartha medical college, Dr.NTR University of Health Sciences, Vijayawada, India)*
[2]*(Department of DVL, Siddhartha medical college, Dr.NTR University of Health Sciences, Vijayawada, India)*
[3]*(Department of DVL, Siddhartha medical college, Dr.NTR University of Health Sciences, Vijayawada, India)*

Abstract:
Introduction*: Patients with trophic ulcers frequently attend outpatient departments to get treated. Management of patients with trophic ulcers & their consequences are difficult not only because it is a recurrent and recalcitrant problem but also because the pathogenesis of the ulcer may be different in each patient.*
Aim of the study: *This study aims at studying and comparing the efficacy of antibiotic impregnated {mupirocin 2%w/w, metronidazole1%w/w} collagen granules dressing versus platelet rich fibrin dressing (PRF) in the treatment of trophic ulcers with qualitative analysis of the results done in terms of: Healthy granulation tissue and rate of wound closure.*
Materials and methodology: *A hospital based retrospective study was conducted and collected the records of 30 trophic ulcer patients who had attended our department for the treatment of trophic ulcers between july2018 and July 2019 and were divided into 2 categories {collagen group and platelet rich fibrin dressings group} for the sake of analysis of the results.*
Results: *Average time for the appearance of healthy granulation tissue was 8 days in the collagen group vs 14 days for the platelet rich fibrin dressings group and 87% collagen group attained 75% of wound closure compared to 80% in the conventional group.*
Conclusion: *Antibiotic impregnated collagen granules were found to promote better and faster rates of wound healing while providing adequate scaffolding for the formation of healthy granulation tissue, with a broad-spectrum antibiotic coverage over the local wound surface while reducing the systemic toxicity and higher rate of wound closure.*
Keywords: *collagen granules, platelet rich fibrin (PRF), Trophic ulcers, ulcer dressings.*

Date of Submission: 04-10-2021 Date of Acceptance: 18-10-2021

I. Introduction

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, vascular insufficiency or loss of afferent nerve fibres". Ulcers which take more than 6 weeks to heal are called Chronic

nonhealing ulcers. Various causes for trophic ulcers are neurogenic (examples: Hansen's disease, syringomyelia, pressure ulcers in paraplegics, spina bifida, diabetic neuropathy, alcoholic polyneuropathy), vascular (Arterial: peripheral vascular disease, arteriosclerosis, microangiopathy as in diabetes; Venous: Venous stasis ulcers), systemic causes or malnutrition (Vitamin B12 deficiency, ulcers over deposits of gout)[1.] The most common site for trophic ulcers is foot (base of great toe, metatarsal head and calcaneum). Management of patients with trophic ulcers & their consequences are difficult not only because it is a recurrent and recalcitrant problem but also because the pathogenesis of the ulcer may be different in each patient. Untreated trophic ulcers lead to infection, limb deformities, osteomyelitis and finally to amputation.

Various methods for treatment of chronic non-healing ulcers are: 1) Conventional dressings 2) Hydrocolloidal dressings 3) Vacuum assisted dressings 4) Platelet rich fibrin (PRF) 5) Hyperbaric oxygen therapy 6) Ozone therapy etc[6] . Collagen dressing is a bioactive dressing, which is a variant of hydrocolloidal dressings.

II. Aiim of The Study

To compare the efficacy of antibiotic impregnated [mupirocin 2%w/w, metronidazole1%w/w] collagen granules dressing versus PRF [platelet rich fibrin] dressing in the treatment of trophic ulcers. Qualitative

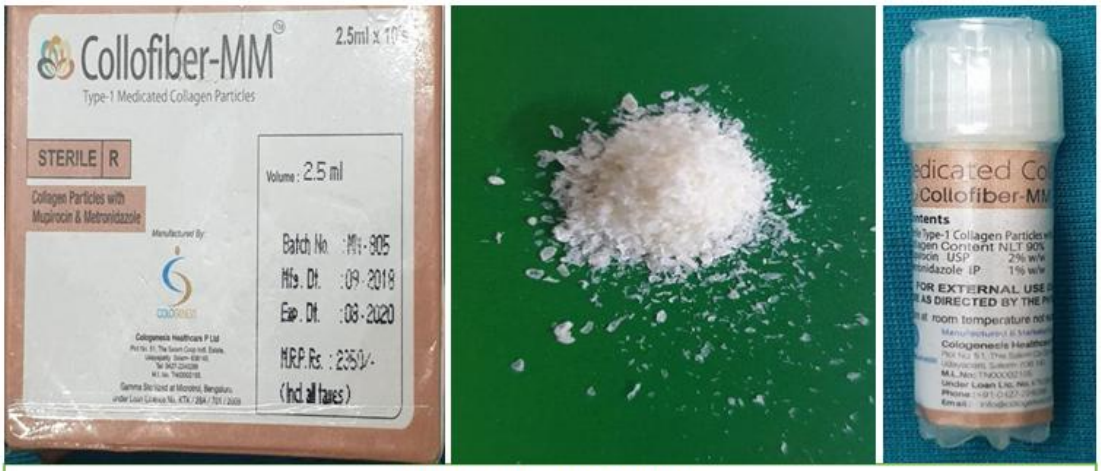
analysis of the results was done in terms of: 1) Healthy granulation tissue. 2) Rate of wound closure.

III. Materials And Methods

A hospital based retrospective study was conducted between July 2018 and July 2019 i.e., 12 months, at our DVL Department. Data of 30 trophic ulcer patients was collected, and divided into to two equal groups:
GROUP A: collagen granules dressing group.
GROUP B: PRF dressing group.
Inclusion criteria: 1) Patients with non-healing trophic ulcers
2) Ulcers without infection.
Exclusion criteria: 1) Patients with uncontrolled diabetes mellitus, liver and renal diseases.
2) Ulcers with exposed bone without granulation tissue.
3) Ulcers with proven malignancy.
4) Patient with history of hypersensitivity to mupirocin or metronidazole.

Collagen granules dressing group:

- Cleansing and debridement of the wound was done, followed by application of colloidal granules (collofiber-MM) with thickness of 2mm on to the wound surface.
- The wound was covered with non-sticky occlusive dressing. Moist wound environment was maintained.
- Wound dressing was changed every 3rd day.



COLLAGEN GRANULES

PRF group:

- 5-10ml of blood was collected under aseptic precautions in a sterile vial without anticoagulant. It was immediately centrifuged at 2800 rpm for 15minutes. At the end of centrifugation, a natural fibrin matrix gel was obtained with RBCs at the base and cellular plasma at the top.
- Cleaning and debridement of the ulcer was done under aseptic conditions.
- The fibrin gel was placed over the ulcer base & covered with a sterile dressing which was left until next dressing, i.e., after 7 days.

PLATELET RICH FIBRIN PREPARATION

IV. Results

In our study all patients were between 40-60 years. In group A 9 patients were aged between 40-49 years and 6 patients between the age group of 50-60 years. In group B 8 patients were between 40-49 years and 7 patients were between 50-60 years age.

The sites of the trophic ulcers were head of the great toe (25 patients) being most common followed by metatarsal head (3 patients), heel (1 patient) and medial malleolus (1 patient).

Trophic ulcers due to Hansen's (22 patients) being the most common aetiology followed by diabetic ulcers (7 patients) and venous ulcer (1 patient). The time taken for the appearance of healthy granulation tissue was least for head of the great toe and greatest for heal.

Out of 15 collagen dressings patients, 90% (13 patients) showed 75% wound closure at 2-4weeks and 80% (12 patients) showed complete resolution at the 6 weeks. In 15 PRF dressing patients, 80% (12 patients) showed 75% wound closure at 3-6 weeks and 53% (8 patients) had complete healing at the end of 6 weeks. Average time for appearance of the granulation tissue was 8 days in collagen group versus 12 days for PRF dressing group.

SITE	COLLAGEN GRANULES DRESSING	PRF DRESSING
Head of the great toe	3 days	6 days
Metatarsal head	8 days	14 days
Heel	14 days	21 days

Time taken for healthy granulation tissue according to site of the

SIZE OF THE ULCER	COLLAGEN GRANULES DRESSING	PRF DRESSING
<3 cms	1 week	1.5 weeks
4-9 cms	3 weeks	3 weeks
>9 cms	5 weeks	6 weeks

Time taken for 50% reduction in size of ulcer (weeks)

In our study the average time taken for the appearance of healthy granulation tissue in patients treated with collagen granules are 8 days and in PRF group are 14 days producing a p value of 0.003(significant p value: <0.005), which is significant. The number of patients with 75% wound closure are 13(90%) in group A and 12(80%) in group B producing a p value of 0.21, which is not significant (Pearson Chi-Square Test is used).

V. Discussion

In normal wound healing process, matrix metalloproteinases (MMP) breakdown the malformed & damaged collagen present at the site of the wound. In chronic non-healing ulcers like trophic ulcers higher levels of MMPs are present, these elevated levels of MMPs lead to increased proteolytic activity leading to damage of the newly synthesized normal collagen and finally leading to non-healing ulcers. Trophic ulcers are also sites of increased levels of proinflammatory cytokines like TNF-α and lower in growth factors like platelet derived growth factor (PDGF) and tissue inhibitors of matrix metalloproteinases (TIMMP). So, when dressings containing collagen are used, MMPs are kept busy breaking down the externally given collagen and healthy

collagen which is innate to the body is protected, helping in the healing process. The use of collagen has also been found to inhibit the action of proteinases and promote wound healing by deposition and organisation of freshly formed fibres and granulation tissue in the wound bed.

Topical antibiotics Metronidazole and Mupirocin are active locally against anaerobic bacteria and gram-positive bacteria respectively. This leads to local protection of the wound with decrease of oral antibiotics.

PRF, which is a second-generation platelet concentrate is rich in growth factors like PDGF, epithelial growth factor (EGF), which helps in healing of chronic non-healing ulcers.

There are no studies available comparing the efficacy of collagen granules and PRF in the healing of chronic non- healing trophic ulcers. Hence, we compared our study to available studies on collagen granules and PRF individually. In our study 75% of ulcer healing was obtained at 2-4 weeks using collagen granules dressing, while 50% and 45.43% ulcer healing was produced in studies conducted by Shimikore et al and Karunakar et al respectively[2] [3]. The healing of the ulcer by 75% was obtained by 3-6 weeks with PRF dressing in our study. In studies conducted by Umashankar et al and Madhavi et al healing was 93.52% and 69.5% at 2 weeks respectively with PRF dressing[5] [6].

Few advantages of collagen dressing are: 1) increased patient compliance.

2) simplicity of the procedure- there is no hassle to draw blood and centrifuge.
3) local protection by antibiotic impregnated collagen granules against gram positive, negative and anaerobic bacteria.
4) less duration of intake of oral antibiotics.
5) it can be easily performed at smaller setup.

VI. Conclusion

This study was done in order to find various effective treatment methods for trophic ulcers which are patient complaint. Finally, we conclude that antibiotic impregnated collagen granules promote faster healing of trophic ulcers than PRF, with final outcomes being the same for both.

References

[1]. Puri, V., Venkateshwaran, N., & Khare, N. (2012). Trophic ulcers-Practical management guidelines. *Indian journal of plastic surgery : official publication of the Association of Plastic Surgeons of India*, *45*(2), 340–351. doi:10.4103/0970-0358.101317.

[2]. Shimikore S S, Pawar GB. A randomized controlled trial to compare efficacy of collagen granule-based dressing versus conventional dressing in the management of diabetic foot ulcers. Arch Med Health Sci 2018;6:28-31

[3]. Chalimidi, Karunakar Reddy et al. "Efficacy of Collagen Particles in Chronic Non Healing Ulcers." *Journal of clinical and diagnostic research : JCDR* vol. 9,6 (2015): PC01-3. doi:10.7860/JCDR/2015/11782.6001.

[4]. Journal of Clinical and Diagnostic Research. 2019 Mar, Vol-13(3): WD01-WD03. Gatha M Upadya and Srinidhi Govindarajan, Novel Treatment for Hard-to-Heal Chronic Plantar Ulcers in Hansen's Disease.

[5]. Nagaraju U, Sundar PK, Agarwal P, Raju BP, Kumar M. Autologous platelet-rich fibrin matrix in non-healing trophic ulcers in patients with Hansen's disease. J Cutan Aesthet Surg 2017;10:3-7

[6]. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 18, Issue 2 Ser. 15 (February. 2019), PP 51-58 www.iosrjournals.org DOI: 10.9790/0853-1802155158 www.iosrjournals.org 51 | Page Clinico-Etiological Study of Efficacy of Autologous Platelet Rich Fibrin in Chronic Non Healing Ulcers

Dr.Durvasula.A.N.Maithili, et. al. "A Comparative Study Of Efficacy Of Antibiotic Impregnated Collagen Granules Dressings Vs Platelet Rich Fibrin Dressings For Treatment Of Trophic Ulcers." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(10), 2021, pp. 01-04.