COMPARABLE CLINICAL EFFECTS OF THE AUTOLOGOUS COMBINED LEUKOCYTE, PLATELET, AND FIBRIN PATCH ON DIABETIC FOOT ULCERS DESPITE LOW ABI VALUES IN THE AFFECTED LIMB

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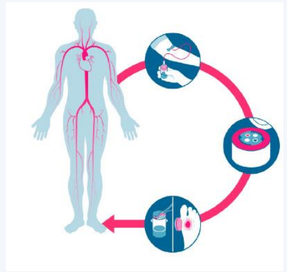
PURPOSE

This study provides a retrospective analysis of fifteen patients with diabetic foot ulcers(DFUs) treated with an autologous patch consisting of leukocytes, platelets, and fibrin. These challenging patients with severe comorbidities have failed conventional treatment for diabetic foot wounds, consisting of local wound care, sharp debridement and offloading using a total contact cast system (TCC). In addition, we analyzes the effect of therapy even in the presence of poor perfusion and ischemia in patients who could not be optimized from a vascular standpoint. Here we describe the outcome of real-world implementation of a unique technology.

BACKGROUND

Diabetic foot ulcers (DFUs) remain a clinical challenge and the affected patients bear a high risk of increased mortality and amputation. The underlying pathogenesis arises from compromised peripheral blood flow due to the onset of ischemia or neuropathy leading to the risk of lower limb loss. The incidence of amputation is 20 times higher in diabetic patients than in those without diabetes. In other words, more than 1 million people with diabetes will lose a leg every year due to complications from diabetes. Not only is the lower limb at risk but the patient's life is as well; since 2021 there have been approximately 6.7 million adults between the age of 20-79 who have died either from diabetes alone or complications that followed it. In one study, patients treated according to protocols based on the International Consensus on the Diabetic Foot were followed for 1 year and 23% did not heal. DFU recurrence is also common; within 1 year after healing from an ulcer, 40% of patients have a recurrence.

A three layered autologous combined leukocyte, platelet and fibrin (CLPF) patch* has been developed and is now available to U.S. patients. The CLPF patch is produced from the patient's own blood in a 20-minute process by a unique procedure consisting of centrifugation, coagulation and compaction.



The resulting patch is fully autologous, readily transferable to the patient and displays a three layered structure of leukocytes, platelets and fibrin resulting in cell and growth factor release into the wound bed.

*3C Patch®, Reapplix

The CLPF patch has been investigated in a large randomized controlled trial. Game et al evaluated the clinical effect of the CLPF patch on hard-to-heal DFUs in a multi-centered (32 clinics), observer masked, randomized clinical trial (RCT, n=269)[1]. Hard-to-heal DFUs were defined by less than 50% reduction in a 4-week run-in period. Weekly applications of CLPF patch resulted in significantly more ulcers healed and a shorter time-to-healing in the treatment group compared to best standard care alone[1]. As a result, the International Working Group on the Diabetic Foot(IWGDF) recently recommended CLPF Patch as an adjunctive treatment for non-infected diabetic foot ulcers that are difficult to heal[2]. We implemented the patch into our clinical setting, the PULSE Amputation and Prevention Center in El Paso, TX. Here we describe a retrospective analysis of the initial 15 patients treated.

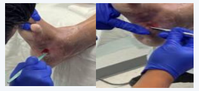
MATERIALS AND METHODS

15 patients treated at our facility that were non-responsive to best standard of care were treated with CLPF patch. A retrospective analysis of outcomes was made by extracting data from the EMR system. Select demographics (sex, age, ethnicity) and patient status (presence of CKD, neuropathy, HBA1C, PAD, revascularization date, prior amputation and other comorbidities) were extracted to describe the cases and the patient population as a whole. Furthermore, wound specific data was extracted including wound size, wound age, Wagner grade, WIFI grading, wound location, and secondary wound dressing used. Descriptive statistics were done and perfusion-based subgroups (ABI <0.8 vs. ABI >0.8) were compared. Selected cases are described and area data depicted by graphs in this presentation.

RESULTS

A total of 18 wounds on 15 patients were treated. Pictures and selected clinical data extracted from the EMR are shown and summarized below.

Case 1

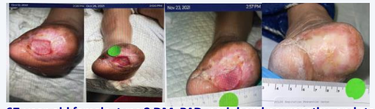


48-year-old male, type 2 DM, PAD, peripheral neuropathy, Charcot neuroarthropathy. Average Weekly Decrease in Wound Size: Length: 22.5%, Width: 22.95%, Depth: 0%, Area: 15%. Wound sharply debrided with ringed curette, CLPF Patch applied and TCC system used.

Case 2

37-year-old male, type 2 DM, peripheral neuropathy. Average Weekly Decrease in Wound Size: Length: 19%, Width: 27.9%, Depth: 15.4%, Area: 8.5%. Wound sharply debrided with ringed curette, CLPF Patch applied and TCC system used.

Case 3

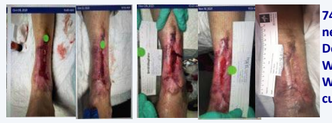


67-year-old female, type 2 DM, PAD, peripheral neuropathy, end stage renal disease on hemodialysis, history of trans-metatarsal amputation. Average Weekly Decrease in Wound Size: Length: 6.8%, Width: 5.8%, Depth: 0%, Area: 7%. Wound was sharply debrided with ringed curette, CLPF patch applied weekly.

Case 4

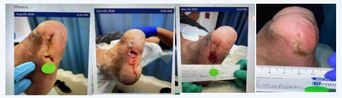
58-year-old male, type 2 DM, peripheral neuropathy, PAD. Average Weekly Decrease in Wound Size: Length: 9.55%, Width: 4.3%, Depth: 33.35%, Area: 1.5%. Wound sharply debrided with #15 blade, CLPF patch applied weekly.

Case 5



74-year-old male, type 2 DM, peripheral neuropathy, PAD. Average Weekly Decrease in Wound Size: Length: 9.3%, Width: 12.54%, Depth: 25%, Area: 11.4%. Wound sharply debrided with ringed curette, CLPF patch applied weekly.

Case 6

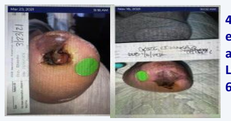


49=year-old male , type 2 DM, PAD, peripheral neuropathy, history of right foot trans-metatarsal amputation. Average Weekly Decrease in Wound Size: Length: 1.4%, Width: 11.9%, Depth: 61.1%, Area: 2%. Wound sharply debrided with ringed curette, CLPF patch applied weekly.

Case 7

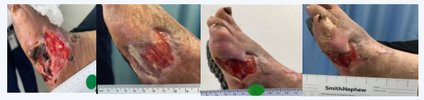
89-year-old male, type 2 DM, PAD, peripheral neuropathy. Average Weekly Decrease in Wound Size: Length: 24.68%, Width: 13.58%, Depth: 100%, Area: 17%. Wound sharply debrided with ringed curette, CLPF patch applied weekly.

Case 8



45-year-old male, type 2 DM, PAD, peripheral neuropathy, end stage renal disease on hemodialysis, history of Chopart amputation. Average Weekly Decrease in Wound Size Length: 44.44% Width: 28.57% Depth: 100% Area: 60.32%

Case 9



52-year-old male, type 2 DM, PAD, peripheral neuropathy, end stage renal disease on hemodialysis. Wound was sharply debrided with ringed curette, CLPF patch applied weekly.

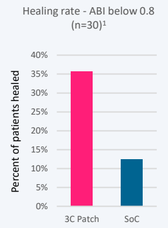
Ischemic Subgroup Analysis

In patients with less than optimal perfusion either due to failed revascularization attempts or no option for revascularization, patients who were treated with CLPF patch had similar healing rates despite suboptimal perfusion.

	ABI >0.8 (n=8)	ABI<0.8 (n=10)
Wound age (months)	9.4	14.2
Wound size (sq. cm.)	3.0	6.1
Healing rate	63%	60%
Time to healing (weeks)	13	19
HBA1C	9.6	7.4
Patient age	48.25	65.8
BMI	32.1	25.2
CLPF patch applications	9.25	8.8

DISCUSSION

In this retrospective analysis of 18 wounds in fifteen patients, the use of the autologous CLPF patch, in conjunction with local sharp debridement and offloading measures (total contact casting), was shown to decrease the sizes of diabetic foot wounds on a weekly basis, especially in the setting of chronic wounds that were non-responding for more than four weeks. Of the fifteen patients receiving at least one application, eleven patients completely healed (complete epithelialization) within the twenty-week evaluation period. Subgroup analysis based on perfusion indicate that a clinical effect is seen even in patients with limited perfusion. This could be resulting from the angiogenic factors (e.g. VEGF) released from the patch[3]. Subgroup data from the large RCT[1] showed similar effect in patients with an ABI < 0.8.



CONCLUSIONS

The outcomes found in this real-world dataset, including a very challenging patient population, support the applicability of this well proven technology in the U.S. wound center setting. Subgroup analysis supports previous data showing a beneficial effect even in patients with limited perfusion.

References

1. Game F et al. The Lancet. 2018 Nov; 6(11): 870-878.
2. Rayman G et al. on behalf of the International Working Group on the Diabetic Foot (IWGDF) 2019, www.iwgdfguidelines.org.
3. Lundquist, R et al.. Wound Repair and Regeneration. 2013; 21(1), 66–76.

FOR MORE INFORMATION CONTACT:
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