Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Dermatology and Venereology

A Case Report: Efficacy of SC-PWJSC for Static and Diabetic Foot Ulcer

Sukmawati Tansil Tan[1], Yohanes Firmansyah[2*]

[1]Departement of Dermatology and Venereology, Tarumanagara University, Jakarta, Indonesia
[2]General Practitioner, Tarumanagara University, Jakarta, Indonesia

DOI: 10.36347/sjmcr.2022.v10i03.019 | **Received:** 13.02.2022 | **Accepted:** 21.03.2022 | **Published:** 25.03.2022

***Corresponding author:** Dr. Yohanes Firmansyah, MH, MM, AIFO-K
General Practitioner, Tarumanagara University, Jakarta, Indonesia

Abstract | **Case Report**

Static ulcers and diabetic ulcers are a type of chronic ulcers that are often difficult to treat with traditional therapy with a failure rate of over 50%. This case explains the efficacy of secretome from the Placental Wharton Jelly Stem Cell (SC-PWJSC) added to a 65-year-old male with a static ulcer and diabetic ulcer that lasted 14 months. Therapy using secretome from Placental Wharton Jelly Stem Cell (SC-PWJSC) for eight weeks allows a closed wound followed by a scar with no side effects. The patient is delighted with the results of the procedure.

Keywords: statis ulcer; diabetic ulcer, diabetes mellitus, cutaneous injection, SC-PWJSC.

INTRODUCTION

A diabetic foot ulcer is a chronic diabetes complication in deeper tissue lesions, neurological disorders, and lower limb vascular peripheral disorders [1]. As a result of worldwide diabetes and improved life expectancy of diabetic foot ulcers, diabetic foot ulcers have increased. Amputation occurs every 30 seconds, as a result of diabetes, in the lower extremities [2], And the health costs of $8659 per patient were high [3]. In the U.S., medical expenses vary from $9 billion to $13 billion to treat diabetic foot disease and additional costs of diabetes [4]. Due to a major social, medical, and economic burden, the International Diabetes Fund has called on the public to raise awareness about diabetic foot conditions [5]. Of all amputations in diabetic patients, 85% are preceded by foot ulceration, which then worsens into severe gangrene or infection which is difficult to resolve [6].

The wound healing rate for chronic wounds is very poor, especially diabetic foot ulcers (DFU) [7], Impacts greatly on patients and their families' health and quality of life. The frequently felt consequences include discomfort, loss of function and mobility, depression, difficulty and anxiety, guilt, social insulation, long-term hospital stay's financial burden, and chronic illness, including death [8]. Previous studies have shown that persistent ulcers are a big burden and sometimes induce an inferior quality of life. Therefore, chronic ulcers that are effective and inexpensive to improve people's quality of life with foot diabetic ulcers are important for wound care and management [7, 9, 10].

This case report describes that the Secretome from Placental Wharton Jelly Stem Cell (SC-PWJSC) ability as an additional therapy to cause better-wound healing.

CASE DESCRIPTION

A 65-year-old man came complaining that it was difficult to heal in the outer left ankle area. The wound has not recovered since 14 months ago, and has tried various types of treatment. The wound initially looks like varicose veins, and after a few months, a small wound develops but over time, it gets more significant to the size of a coin. The patient is known to have a history of diabetes mellitus since ten years ago with rough treatment.

The patient current subjective concern is leg discomfort with pain, delayed chronic wound healing, and discharge. Patients regularly use Povidone-iodine to disinfect their wounds to avoid infection and unpleasant odors. A venous stasis ulcer and diabetes ulcer were found on physical examination. The neovascular condition around the wound is a reddish-blue wound with standard Capillary Refill Time (Figures 1).

Patients signed up the agreement to follow treatment secretome gel from *Placental Wharton Jelly Stem Cell (SC-PWJSC)* to be applied every day after the

wound was cleaned with NaCl. Patients are also asked to note the symptoms of side effects that may arise from allergic reactions such as itching, redness, burning sensation, and swelling to seek first aid if severe side effects appear that are very disturbing.

After eight weeks of the procedure, the patient returned to control with a closed wound, followed by a scar without side effects. Symptoms of side effects during the intervention were not discovered. During the intervention, treatment is the only treatment with injection of insulin and secretome gel from Placental Wharton Jelly Stem Cell (SC-PWJSC) accompanied by regular blood sugar control (Figures 2).

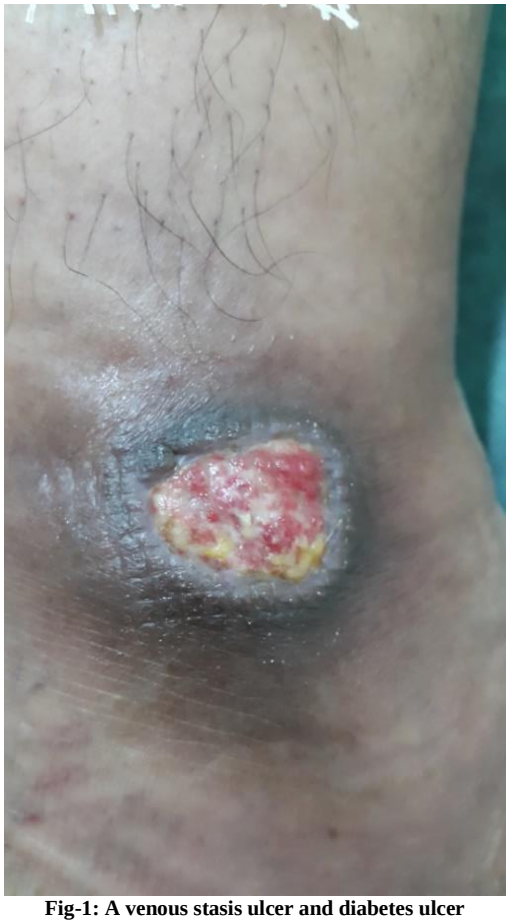

Fig-1: A venous stasis ulcer and diabetes ulcer

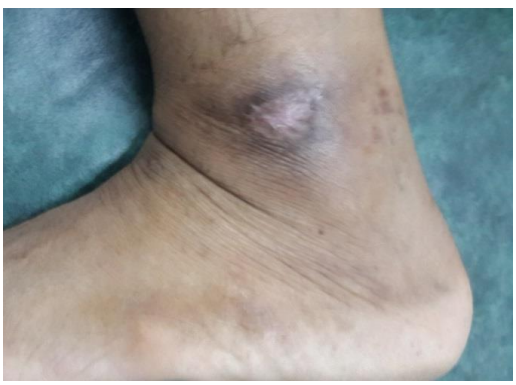

Fig-2: Closed wound followed by a scar without side effects

DISCUSSION

Stem cell therapy is a modern therapy that offers new hope to new wound healing methods and usually follows the physiology of wound healing. These stem cells have growth and healing factors to repair injuries [11]. This wound healing process requires removing cells that are not separated into the matrix by healing factors and causes the cell division to close the wound. On the other hand, these stem cells also play a role in immunomodulation by suppressing cytokines, suppressing inflammation, and interacting with macrophage regulators. This whole process affects tissue regeneration, new capillary development (angiogenesis) and accelerates the epithelialization process in chronic wounds so that healing continues as before [12,13].

The wound healing process using Mesenchymal stem cells (MSCs) is a process that resembles the physiology of wound healing, beginning with Mesenchymal stem cells (MSCs), which differentiate into fibroblasts and pericyte tissue and form endothelial-like tissues or cells that further play a role in vasculogenesis [14, 15]. Previous literature studies have shown that Wharton's Jelly derived mesenchymal stem cells (WJ-MSCs) have a rich composition of undifferent cells that have excellent immunomodulatory properties and do not induce rejection reactions in the allotransplantation phase in major organ repairs such as heart, cartilage, liver, bone, pancreas, fat, and blood vessels [16]. MSCs formed from WJ-MSCs in extracellular space release several angiogenic factors, including basal fibroblast growth factor (bFGF) and VEGF, which alter beta-growth factor (TGF-β), PDGF, ANG-1, placental growth factor (PIGF), IL-6, hepatocyte growth factor (HGF) and monocyte-one chemoattractant protein (MCP-1), which induces in vitro and in vivo angiogenesis (22). VEGF and TGF-β1 secreted in CM promote angiogenesis and activate PI3K / Act and MAPK pathways; HGF reveals its angiogenic nature by inducing VEGF expression [17].

The use of MSC, which is rich in secretome topically in the field of regenerative medicine, has many primary advantages from the provision of stem cells by other methods, namely (1) the use of secretome has excellent protection compared to live cell transplantation directly (invasive) (2) the safety, dosage, and ability of MSC-derived secretome is often assessed (3). Topical MSC has a feature or efficacy that is no less effective than invasive administration, including immune modulation, angiogenesis, and wound healing (4). It is easy to store and can last for a long time without losing effectiveness or even becoming toxic (5). Secretome from Wharton's Jelly-derived mesenchymal stem cell (WJ-MSC) umbilical cord has economic and functional value and can be mass-produced under standard laboratory control (6). Umbilical cord Wharton's Jelly derived mesenchymal stem cells (WJ-

MSCs) may not only be used for the healing of chronic ulcers. They may also be used in several other medical fields, such as acute wounds, cerebral ischemia, and myocardial (7). It is versatile and can be used as a therapeutic application and can be changed as needed for different cells (23).

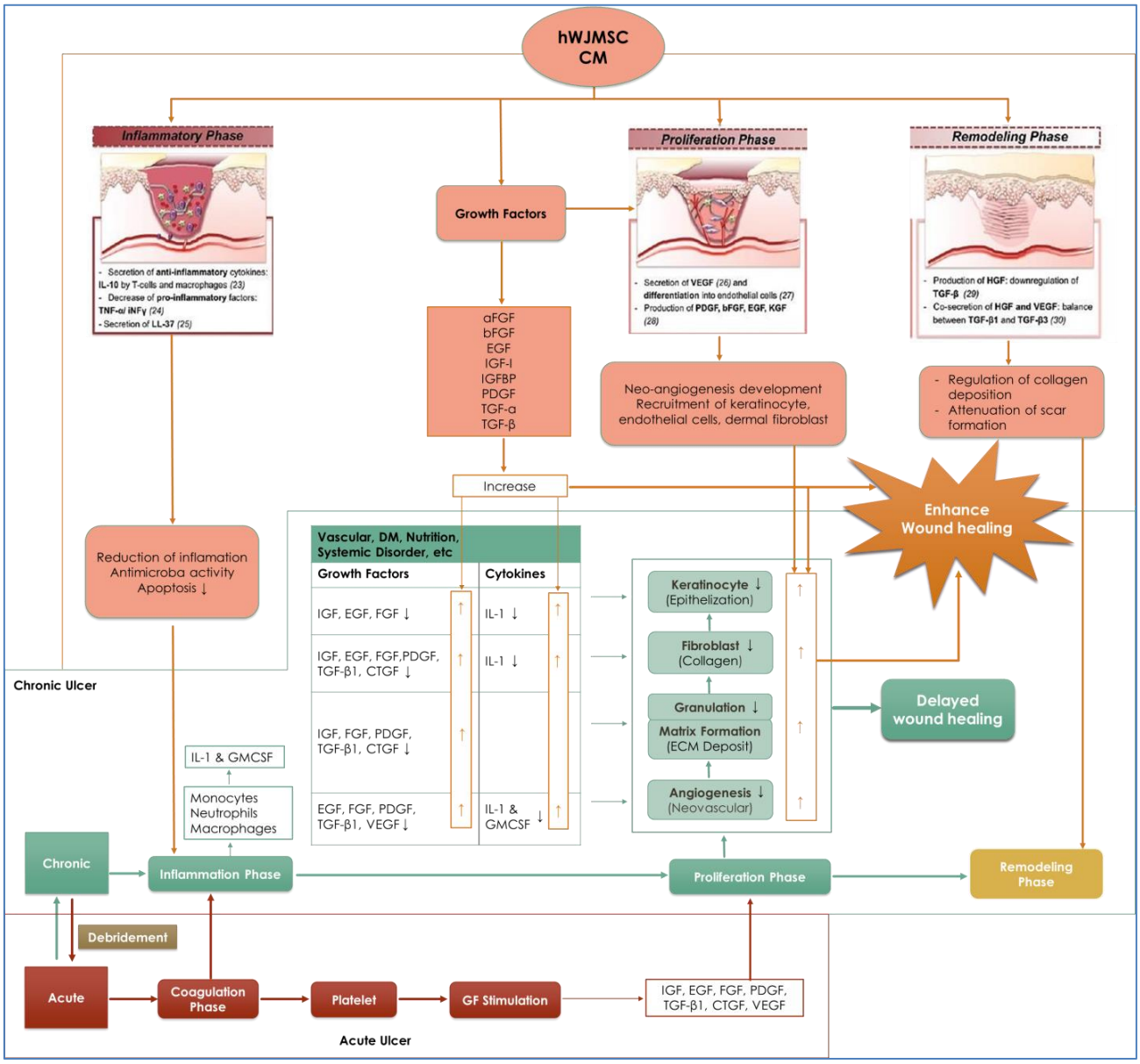

Fig-3: Mechanism-secretome of the Placental Wharton Jelly Stem Cell (SC-PWJSC) improves chronic wound healing at any stage of the wound healing process. (Created by Sukmawati Tansil Tan)

This case report shows the excellent predicted result without side effects from using secretome from Placental Wharton Jelly Stem Cell (SC-PWJSC) therapy, which is very simple and can also be applied separately to patients very promising results and reduces potential impairment. In the future, this study can be carried out on a wide scale in Indonesia, beginning with serial case reports, clinical studies, and randomized controlled trials (RCTs).

CONCLUSION

Static ulcers and diabetic ulcers are a form of chronic ulcers that are often difficult to cure with more than 50% treatment failure rates with conventional therapy. This case describes the effectiveness of secretome from Placental Wharton Jelly Stem Cell (SC-PWJSC), which was applied to a 65-year-old male with a static ulcer and diabetic ulcer that had lasted for 14 months. Therapy using secretome from Placental Wharton Jelly Stem Cell (SC-PWJSC) for eight weeks makes a closed wound followed by a scar without side effects. The patient is delighted with the outcome of the therapy.

REFERENCES

1. Apelqvist, J. (2012). Diagnostics and treatment of the diabetic foot. *Endocrine*, *41*(3), 384-397.
2. Boulton, A. J., Vileikyte, L., Ragnarson-Tennvall,

G., & Apelqvist, J. (2005). The global burden of diabetic foot disease. *The Lancet*, *366*(9498), 1719-1724.
3. Ragnarson Tennvall, G., & Apelqvist, J. (2004). Health-economic consequences of diabetic foot lesions. *Clinical Infectious Diseases*, *39*(Supplement_2), S132-S139.
4. Rice, J. B., Desai, U., Cummings, A. K. G., Birnbaum, H. G., Skornicki, M., & Parsons, N. B. (2014). Burden of diabetic foot ulcers for medicare and private insurers. *Diabetes care*, *37*(3), 651-658.
5. Jeffcoate, W., Bakker, K. (2005). World Diabetes Day: footing the bill. Lancet [Internet]. Apr;365(9470):1527. Available from: https://linkinghub.elsevier.com/retrieve/pii/S0140673605664379
6. Zhang, P., Lu, J., Jing, Y., Tang, S., Zhu, D., & Bi, Y. (2017). Global epidemiology of diabetic foot ulceration: a systematic review and meta-analysis. *Annals of medicine*, *49*(2), 106-116.
7. Järbrink, K., Ni, G., Sönnergren, H., Schmidtchen, A., Pang, C., Bajpai, R., & Car, J. (2016). Prevalence and incidence of chronic wounds and related complications: a protocol for a systematic review. *Systematic reviews*, *5*(1), 1-6.
8. MacDonald, J. (2009). Global initiative for wound and lymphoedema care (GIWLC). *Journal of Lymphoedema*, *4*(2), 92-5.
9. Denny, K., Lawand, C., & Perry, S. (2013). Compromised wounds in Canada. *Healthcare Quarterly (Toronto, Ont)*, *17*(1), 7-10.
10. Heyer, K., Augustin, M., Protz, K., Herberger, K., Spehr, C., & Rustenbach, S. J. (2013). Effectiveness of advanced versus conventional wound dressings on healing of chronic wounds: systematic review and meta-analysis. *Dermatology*, *226*(2), 172-184.
11. Bluestein, D., & Javaheri, A. (2008). Pressure ulcers: prevention, evaluation, and management. *American family physician*, *78*(10), 1186-1194.
12. Bielecki, T. M., Gazdzik, T. S., Arendt, J., Szczepanski, T., Krol, W., & Wielkoszynski, T. (2007). Antibacterial effect of autologous platelet gel enriched with growth factors and other active substances: an in vitro study. *The Journal of bone and joint surgery. British volume*, *89*(3), 417-420.
13. Abrigo, M., McArthur, S. L., & Kingshott, P. (2014). Electrospun nanofibers as dressings for chronic wound care: advances, challenges, and future prospects. *Macromolecular bioscience*, *14*(6), 772-792.
14. Spaeth, E. L., Dembinski, J. L., Sasser, A. K., Watson, K., Klopp, A., Hall, B., ... & Marini, F. (2009). Mesenchymal stem cell transition to tumor-associated fibroblasts contributes to fibrovascular network expansion and tumor progression. *PloS one*, *4*(4), e4992.
15. Bianco, P., Robey, P. G., & Simmons, P. J. (2008). Mesenchymal stem cells: revisiting history, concepts, and assays. *Cell stem cell*, *2*(4), 313-319.
16. Nekanti, U., Rao, V. B., Bahirvani, A. G., Jan, M., Totey, S., & Ta, M. (2010). Long-term expansion and pluripotent marker array analysis of Wharton's jelly-derived mesenchymal stem cells. *Stem cells and development*, *19*(1), 117-130.
17. Samakova, A., Gazova, A., Sabova, N., Valaskova, S., Jurikova, M., & Kyselovic, J. (2019). The PI3k/Akt pathway is associated with angiogenesis, oxidative stress and survival of mesenchymal stem cells in pathophysiologic condition in ischemia. *Physiological research*, *68*, S131-S138.