ISSN-e 1984-8773

SOCIEDADE BRASILEIRA DE DERMATOLOGIA

Surgical & Cosmetic Dermatology

APOIO CIENTÍFICO:

www.surgicalcosmetic.org.br/

Microneedling plus topical insulin for atrophic acne scar revision in Fitzpatrick skin phototype IV: case report

Microagulhamento combinado com insulina tópica para correção de cicatriz de acne atrófica em pele fototipo IV de Fitzpatrick: relato de caso

DOI: http://www.dx.doi.org/10.5935/scd1984-8773.2023150261

ABSTRACT

Atrophic acne scars result from an abnormal wound-healing response that can be treated with microneedling (MN). Insulin may play a role in wound healing. The effectiveness and safety of combining MN with topical insulin as an alternative therapy for atrophic acne scar revision have not yet been widely reported. We report the case of a 33-year-old woman with an atrophic acne scar on the middle third of her face. The patient was treated with MN and topical insulin for four sessions at two-week intervals. MN plus insulin can be considered an alternative for acne scar revision.

Keywords: Acne Vulgaris; Insulin; Cicatrix; Hyperpigmentation

RESUMO

Cicatrizes atróficas de acne são resultantes de uma resposta anormal de cicatrização de feridas que podem ser tratadas com microagulhamento (MA). A insulina pode desempenhar um papel na cicatrização de lesões. A eficácia e segurança da combinação de MA com insulina tópica como terapia alternativa para correção de cicatriz atrófica de acne ainda não foi amplamente relatada. Relatamos o caso de uma mulher de 33 anos com cicatriz atrófica de acne no terço médio da face. A paciente foi tratada com MA e insulina tópica por quatro sessões com intervalos de duas semanas. MA mais insulina pode ser considerado uma alternativa para a correção de cicatriz de acne.

Palavras-chave: *Acne Vulgar; Insulina; Cicatriz; Hiperpigmentação*

Case Report

Authors:

Kiki Septiafni[1]
Sarah Diba Zulkarnain[1]
Yuli Kurniawati[1]
Soenarto Kartowigno[1]
Nopriyati Nopriyati[1]

[1] Faculty of Medicine Sriwijaya University, Dr. Mohammad Hoesin General Hospital Palembang, Department of Dermatovenereology, Palembang, South Sumatera, Indonesia

Correspondence:
Sarah Diba Zulkarnain
E-mail: sarah_diba_dr@yahoo.com

Financial support: None.
Conflict of interest: None.

Submitted on: 05/05/2023
Approved on: 26/09/2023

How to cite this article:
Septiafni K, Zulkarnain SD, Kurniawati Y, Kartowigno S, Nopriayati N. Microneedling plus topical insulin for atrophic acne scar revision in Fitzpatrick skin phototype IV: case report. Surg Cosmet Dermatol. 2023;15:e20230261.

Introduction

Atrophic acne scars are abnormal wound-healing processes due to excessive inflammation.[1] Several therapeutic options aim to revise acne atrophic scars, including microneedling (MN). Atrophic acne scars revision can use MN alone or combined with other modalities to improve the abnormal wound--healing process as insulin-like growth factor I (IGF-I).[2] Insulin is a peptide hormone homologous to IGF-I.[3] This study aims to evaluate the therapeutic efficacy and safety of MN combined with topical insulin as an alternative therapy for atrophic acne scar revision.

Case Synopsis

A 33-year-old woman, Fitzpatrick skin phototype IV, presented an atrophic acne scar on the 1/3 mid face that impaired her appearance for six months. The patient had a history of severe acne for 15 years (Figure 1A). Assessment of severity using the Goodman and Baron scar scale reached grade 4 (severe), VAS 8, and DLQI 8. We managed the case using MN combined with topical insulin (Human Actrapid®) 100 IU for both sides of the face, at a 2-week interval, four times. Blood sugar level (BSL) (before and after the treatment) was measured (Table 1).

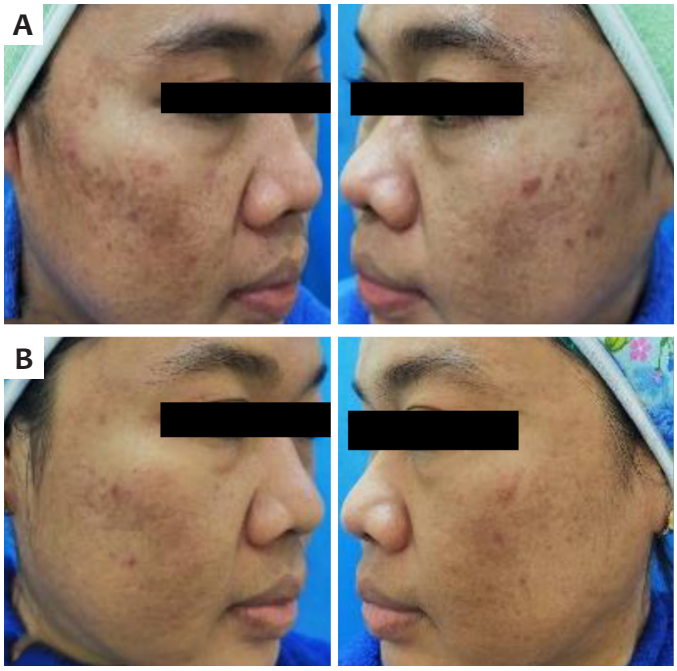

Figure 1: A - Before treatment (baseline)
B - After four sessions

Case discussion

Microneedling in the atrophic acne scar revision normalizes the wound healing phase,[4] improves the skin surace, breaks down abnormal collagen, stimu ates neovascularization, and neo--angiogenesis.[5] Microneedling can also act as transdermal drug delivery (TDD)[5] of macromolecules or peptides[6] by creating thousands of micro-channels through the epidermis to the dermis, and increasing skin permeability. Microchannels can stimulate the release of IGF[4] and increase the absorption of macromolecular and hydrophilic drugs by up to 80%.[7] In this case, both mechanisms of action are based on the reason for choosing MA.

Our case used Human Actrapid insulin® solution 1 ml (100 IU/ml) on both sides of the face. A comparative study with 16 patients with atrophic acne scars treated with MN plus PRP and MN plus topical insulin (split face) showed that MN combined with topical Human Actrapid® insulin 40 IU/ml (1-2 ml) had better results than MN plus PRP.[8] The research showed that insulin can normalize the duration of the inflammatory phase, degrade collagen deposits in atrophic scars, and stimulate IGF, reducing depressed skin tissue and accelerating wound healing by binding insulin-like growth factor-1 (IGF-1).[9] The local adverse events found in our patient were skin erythema and edema for one day, but she could resume activities immediately after the procedure due to minimal pain. A few days after the procedure, there were no other local adverse events as skin peeling and HPI. Reported local adverse events of MN include erythema and edema, resolving within 24 hours, minimal pain, and mild skin peeling. Another local complication is postinflamatory hyperpigmentation; however, Fitzpatrick skin phototype IV-V present it less often.[4] We did not find systemic adverse events before and after the procedure. The combination of MN with

Table 1: Parameter

Parameter	Treatment			
	I (9/6/22)	II (24/6/22)	III (11/7/22)	IV (25/7/22)
Goodman and Baron scar score	4 (servere)	4 (servere)	3 (moderate)	3 (moderate)
VAS	8	7	5	4
DLQI	8	8	4	3
BSL (mg/dl)				
- 30 minute before treatment	125	124	114	106
- 120 minute after treatment	89	106	98	94

Human Actrapid® insulin to treat atrophic acne scars did not cause changes in BSL.[10]

The improvement of scar acne after MN combined with topical insulin therapy (four sessions) assessed by Goodman & Baron criteria qualitatively showed a decrease in the severity of all types of scars from grade 4 (severe) to grade 3 (moderate) and VAS from 8 to 4. Salman et al. reported that patients treated with MN presented better responses in rolling and boxcar scars, while icepick scars had a less significant response. Nevertheless, they could be camouflaged compared to pre-treatment.[4] It improves the patient's quality of life as shown by a decrease in DLQI score from 8 (moderate) to 3 (mild). A retrospective study reported that MN therapy with good therapeutic results significantly impacted patients' quality of life.[10] Patients were satisfied with the improvement in skin texture after four treatments. The success of therapy shows the synergistic effect of MN therapy combined with topical insulin. (Figure 1B)

Conclusion

MN combined with topical insulin for atrophic acne scar revision has good results with temporally local adverse events. However, further studies with larger samples and longer follow-ups are required to determine its effectiveness and safety. ●

REFERENCES:

1. Wilgus TA. Inflammation as an orchestrator of cutaneous scar formation: a review of the literature. Plast Aesthet Res. 2020;7:1–24.
2. Juhasz MLW, Cohen JL. Microneedling for the treatment of scars: an update for clinicians. Clin Cosmet Investig Dermatol. 2020;13:997–1003.
3. Liu H, Wang J, Deng Y, Zou G, Xu J. Effects of topical insulin on wound healing: a meta-analysis of animal and clinical studies. Endocr J. 2021;68(8):969–79.
4. Salman HA, Mohammed ZK. Treatment of acne scar using automated microneedling device of 2.5mm versus 1.5mm: a split face study. Iraqi Postgr Med J. 2020;19(2):110–8.
5. Aldawood FK, Andar A, Desai S. A comprehensive review of microneedles: types, materials, processes, characterizations and applications. Polymers. 2021;13(16):1–34.
6. Clark A, Sivamani R. Microneedles and transdermal transport. In: Peng B, Sivamani RK, Maibach HI, editors. Microneedling in Clinical Practice. New York: CRC; 2021. p. 1–12.
7. Lima E, Lima M. PCI and transcutaneous drug delivery. In: Percutaneous Collagen Induction with Microneedles. Swiss: Springer; 2021. p. 185–95.
8. Pawar M, Singh M. Microneedling with autologous platelet-rich plasma versus microneedling with topical insulin in the treatment of post-acne atrophic scars: a simultaneous split-face comparative study. J Am Acad Dermatol. 2021;85(6):1-4.
9. Benkő BM, Sebe I, Szabó ZI. Insulin for topical use in wound healing: opportunities and limitations. Acta Pharm Hung. 2022;92(1):3–19.
10. Fabbrocini G, Donnarumma M, Vastarella M. Skin needling in acne scars. In: Tosti A, De Padova M, Fabrrocini G, Beer K, editors. Acne scars classification and treatment. 2nd ed. New York: CRC; 2016. p. 67–73.

AUTHORS' CONTRIBUTION:

Kiki Septiafni ORCID 0000-0001-5983-6206
Statistical analysis; Approval of the final version of the manuscript; Study design and planning; Preparation and writing of the manuscript; Collecting, analyzing, and interpreting data; Effective participation in research orientation; Intellectual participation in propaedeutic and/or therapeutic conduct of trained cases; Critical literature review; Critical review of the manuscript.

Sarah Diba Zulkarnain ORCID 0000-0002-9865-519X
Approval of the final version of the manuscript; Study design and planning; Preparation and writing of the manuscript; Collecting, analyzing, and interpreting data; Intellectual participation in propaedeutic and/or therapeutic conduct of studied cases; Critical literature review; Critical review of the manuscript.

Yuli Kurniawati ORCID 0000-0001-7587-5504
Study design and planning; Collecting, analyzing, and interpreting data; Intellectual participation in propaedeutic and/or therapeutic conduct of studied cases; Critical literature review; Critical review of the manuscript.

Soenarto Kartowigno ORCID 0000-0002-1640-8524
Study design and planning; Preparation and writing of the manuscript; Collecting, analyzing, and interpreting data; Effective participation in research orientation; Intellectual participation in propaedeutic and/or therapeutic conduct of studied cases; Critical review of the manuscript.

Nopriyati Nopriyati ORCID 0000-0003-3363-3915
Statistical analysis; Preparation and writing of the manuscript; Effective participation in research orientation; Intellectual participation in propaedeutic and/or therapeutic conduct of studied cases; Critical literature review.