Original paper

Evaluation of the efficacy of RF microneedling and oral isotretinoin in comparison with oral isotretionoin alone in the treatment of acne vulgaris

Intisar Ahmed Hasan[1], Zahraa Najah Mahdi[1], Rana Khalid Obeed[2]

[1]Department of Medicine, Faculty of Medicine, University of Diyala, Baqubah, Iraq
[2]Al-anbar Health Director, Ministry of Health, Iraq

Adv Dermatol Allergol 2023; XL (1): 111–114
DOI: https://doi.org/10.5114/ada.2022.124109

Abstract

Introduction: Acne vulgaris is one of the most common skin illnesses in teenagers, affecting 80% of people aged 11–30 years. Scars on the face are caused by high inflammation, severe acne, physical manipulation of the skin, and delayed treatment.

Aim: To compare the effectiveness and safety of an automated RF micro needling device and oral isotretinoin with oral isotretinon alone alone for treating active acne.

Material and methods: A cross-sectional study of 40 moderate acne sufferers. Twenty patients with active acne were treated with an automated RF microneedling device and isotretinoin 0.5–1 mg/kg. Group B included 20 people with active acne, who were given a single dose of 0.5–1 mg/kg isotretinoin.

Results: In this cross-sectional research, 40 acne vulgaris patients were divided into 2 groups: group A: 23.8 ±3.2 years old, 58.95 ±5.5 kg, 13 females, and 7 males. There were 15 females and 5 males in group B: 24.4 ±3.7 years old and weighing 56.4 ±8.46 kg. After 12 weeks, group A shows better global acne assessment scale (GAAS) outcomes than group B than group B. After 6 months, group A showed better results than group B. The GAAS meaning global acne assessment scale did not change after 4–8 weeks of treatment. There was no age or weight difference.

Conclusions: Acne vulgaris may be treated with fractional RF microneedling. Active acne treatment with RF microneedling is safe and effective, has a quicker response, causes less scarring, and reduces recurrence.

Key words: efficacy, RF microneedling, oral isotretinoin, comparison, oral isotretionoin alone, treatment, acne vulgaris.

Introduction

Acne vulgaris is one of the most common skin diseases of adolescents, occurring in 80% of persons aged 11–30 years [1–3]. Facial acne can leave scarring due to extreme inflammation, severe acne (inflammatory lesions are more apparent, many comedones, papules, pastules, there may or may not be a few nodulocystic lesion), physical handling of the skin, and postponement in looking for acceptable management. The epidemiological data on acne scarring differ [3, 4]. Because the emotional incumbrance and apparent disfigurement of acne scaring, a lot of patients with active acne seek treatment to get rid of scarring [5]. Treatment of acne damaging remain a big concern. Forceful managements, as carbon dioxide laser, chemical peels, results in considerable improvement but are associate with significant side effect, dyspigmentation especially in patients with Fitzpatrick skin types. Non ablative laser have less side effect but do not achieve significant improvement in compares with aggressive treatment [6]. Isotretinoin is an oral management that has an effect on sebaceous glands and is used in the treatment of severe acne. The drug was approved by the US Food and Drug Administration (FDA) in 1982 to manage severe, resistant, nodular acne that is insensitive to conservative treatment such as antibiotics [7]. Fractionated micro needling and laser that ablate or perforate the skin inducing collagen synthesis have shown considerable results [8]. A less invasive micro needling device which also called percutaneous collagen induction (PCI) firstly describe by Orentreich and Orentreich [9]. PCI as a treatment for acne scars finishes by using a tattoo gun [10, 11]. Usually, a dermal wave is a sterile plastic pipe with stainless steel needles prominent between 1–3 mm from the surface of the cylinder. The dermal wave is rolled power-

Address for correspondence: Dr. Intisar Ahmed Hasan, Lecturer, Faculty of Medicine, University of Diyala, Baqubah, Iraq, e-mail: Intesarahmed14@yahoo.com
Received: 25.10.2022, **accepted:** 7.11.2022.

fully over the skin to make numerous needle holes, which leads to numerous microscopic wounds in the dermis, beginning the usual posttraumatic inflammatory reaction, such as releasing growth factors and the creation of collagen and elastin [12, 13]. Current automatic microneedling manoeuvres have progressively substituted the dermal roller. The needle cylinder is substituted by single-use, disinfected needle container with a range of different needle shapes. The benefit of these automated procedure is to control the frequency and depth of penetration in treatment area. Current spontaneous microneedling plans contain numerous sufficient disinfected needles, typically 0.5–3 mm in size [14]. PCI benefit is preservation of the epidermis while hopefully removing collagen, therefore lessening the risk of post-management difficulties and decreasing disruption. Furthermore, it is safe and effective for the treatment of age-related skin illnesses [14].

Aim

The aim of study is to compare the effectiveness and safety of an automated RF micro needling device and oral isotretinoin with oral isotretinon alone for treating active acne.

Material and methods

This was a cross-sectional comparative study of 40 patients with moderate acne vulgaris. The study was performed in Baqubah teaching hospital from December 2021 to August 2022. All information was reviewed to conclude the suitability. The patients were divided into 2 groups: group A comprised 20 patients with active acne, treated with an automated RF microneedling device plus isotretinoin 0.5–1 mg/kg in a single dose for 24 weeks with a cumulative dose of 120–150 mg/kg. Group B comprised 20 patients with active acne, treated by isotretinoin 0.5–1 mg/kg in a single dose for 24 weeks with a cumulative dose of 120–150 mg/kg. Inclusion criteria: healthy male and female patients with moderate acne. Exclusion criteria: pregnant and lactating women, bleeding disorders, and skin infections. The chosen microneedling device (scarlet s RF microneedling, viol, sungnam, South Korean) The Scarlet is one of the top skin rejuvenation and beauty devices. It uses radiofrequency waves with fractional microneedling technology. As the world's first and most well-known manufacturer of FMR systems, Scarlet is the leading brand in fractional technology. When using the Scarlet, 25 needles are inserted into the skin at the same time, and their penetration depth can be adjusted between 0.5 and 3.5 mm with an accuracy of 0.1 mm. The arrangement of these needles is according to a very advanced matrix network and is bipolar [14]. Physician valuation of acne severity was done using the worldwide acne valuation gauge. Microneedling was done at 0, 4, 8, and 12 weeks. Check-ups were made of all patients on weeks 4, 8, and 12 then at 6 months. Photographic picture was done by use camera (IPhone 13) in baseline and every visit, by one person at base line and on every follow-up appointment. All acne lesions counted by hand at first visit and other later visit. All acne lesions were counted by hand at the first visit and at other later visits. The evaluation was done by colouring each lesion with a pen to confirm that each lesion was recorded. The worldwide acne valuation gauge was used in the form of a 5-point scale at baseline and at the end of the study [15].

Table 1. Mean ± SD of patients' age and weight for both groups

Group	Age	Weight
A	23.8 ±3.2	58.95 ±5.53
B	24.4 ±3.7	56.40 ±8.46

Statistical analysis

SPSS 22 was used for statistical analysis. Categorical data assessment utilised frequency and percentage, and for continuous data assessment – mean and SD. *T* test used for assessment of mean differences. *P*-value ≤ 0.05 was considered significant.

Results

This cross-sectional comparative study included 40 patients with acne vulgaris, divided into 2 groups: group A patients had a mean age of 23.8 ±3.2 years and mean weight of 58.95 ±5.5 kg, with 13 females and 7 males. Group B patients had a mean age of 24.4 ±3.7 years and mean weight of 56.4 ±8.46 kg, with 15 females and 5 males, as show in Table 1 and Figure 1.

As show in Table 2; group A: there is significant difference in the mean of GAAS after 8 weeks, after 12 weeks and finally 6 months from baseline. The best difference appear after 6 months from baseline.

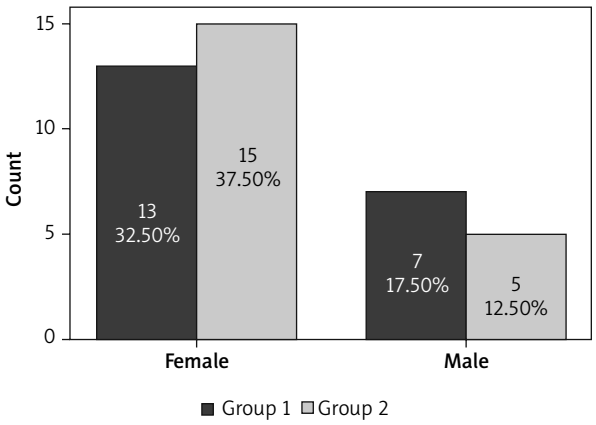

Figure 1. Distribution of patients in both groups according to gender

While Table 3; group B: there is significant difference in the mean of GAAS after 8 weeks, after 12 weeks and finally 6 month from baseline. The best difference appear after 6 months from baseline.

As shown in Table 4, there were significant differences between group A and group B and mean GAAS 12 weeks after the start of treatment. Group A showed better results than group B also 6 months after the beginning of treatment. group A show significant results than group B. There were no significant differences between group A and group B and mean GAAS 4 and 8 weeks after the start of treatment. There was no difference in age and weight.

Discussion

The pathogenesis of acne is the following: (i) sebaceous gland hyperplasia; (ii) irregular follicular hyperkeratinisation; (iii) Cutibacterium acnes; and (iv) inflammatory and immune reactions. Hence, high sebum excretion is the main reason for the progress of acne. Now a day the problem of bacterial resistance to antibiotics lead to use of a non-pharmacological method in acne treatments [16]. Non ablative RF lead to improvement of acne by decreasing production of sebum through heat damaging to sebaceous gland [17]. Another study showed the creation of radiofrequency thermal zones in the dermis using

Table 2. Difference between the mean GAAS from baseline and after 8 weeks, very good response after 8 weeks, then after 12 weeks, and finally 6 months from treatment in group A

Group A	*N*	Mean	Std. deviation	*P*-value
GAAS:				
Baseline	20	4.05	0.6	0.0001
8 weeks	20	1.85	0.6	
GAAS:				
Baseline	20	4.05	0.60	0.0001
12 weeks	20	0.70	0.47	
GAAS:				
Baseline	20	4.05	0.60	0.0001
6 months	20	0.20	0.41	

P-value ≤ 0.05 (significant).

Table 3. Difference between in the mean of GAAS from baseline and after 8 weeks, very good response after 8 weeks, then after 12 weeks, and finally 6 months from treatment in group B

Group	*N*	Mean	Std. deviation	*P*-value
GAAS:				
Baseline	20	3.95	0.51	0.0001
8 weeks	20	2.10	0.55	
GAAS:				
Baseline	20	3.95	0.51	0.0001
12 weeks	20	1.30	0.57	
GAAS:				
Baseline	20	3.95	0.51	0.0001
6 months	20	0.60	0.50	

P-value ≤ 0.05 (significant).

Table 4. Difference in study variables for both groups

Variables	Type	*N*	Mean	SD	*P*-value
Age	Group A	20	23.80	3.2	0.6
	Group B	20	24.40	3.7	
Weight	Group A	20	58.95	5.5	0.26
	Group B	20	56.40	8.4	
Isotretinoin dose	Group A	20	30.50	3.9	0.5
	Group B	20	29.50	5.1	
GAAS Baseline	Group A	20	4.05	0.6	0.57
	Group B	20	3.95	0.5	
4 weeks	Group A	20	3.05	0.6	0.57
	Group B	20	2.95	0.5	
8 weeks	Group A	20	1.85	0.5	0.17
	Group B	20	2.10	0.5	
12 weeks	Group A	20	0.70	0.4	0.001
	Group B	20	1.30	0.5	
6 months	Group A	20	0.20	0.4	0.009
	Group B	20	0.60	0.5	

P-value ≤ 0.05 (significant).

microneedle electrode pairs, so in the current study RF microneedling was used for inflammatory acne vulgaris and its connected dermatologic disorders, like acne scars and distended facial holes [18]. Non ablative RF device cause injury to sebaceous glands, and improve acne by its effect on sebum production, treatment of acne by useing non ablative device with 6 MHz energy, shows 75% improvement of active acne lesion [19]. Another study showed significant 44% improvement with the same RF device [20]. In this study, RF radiation produced by 25 microneedles. This decrease epidermal injury from the microneedle itself and decreasing crust formation and decreasing rehabilitation time. By imparting thermal energy, this radiation decreases the activity of sebaceous glands and encourages cytokines and growth factors, improving skin rehabilitation [21–24]. Adverse effect show as bleeding, pain, so use topical anesthetics used, without significant side effect as depigmentation, scar formation and burns [25].

Conclusions

Fractional RF microneedling is safe and effective for the treatment of acne vulgaris. RF microneedling in the treatment of active acne is safe and effective, with a faster response, less scarring at end of the treatment, and no or less relapse after completing the course. We recommend large sample sizes in subsequent similar studies.

Conflict of interest

The authors declare no conflict of interest.

References

1. Brzezinski P, Wollina U, Smigielski J, Borowska K. The use of isotretinoin in acne therapy in early childhood and its effect on the occurrence of acne symptoms later in life. Eight-year follow-up. Adv Dermatol Allergol 2022; 39: 682-7.
2. Adamski Z, Gornowicz-Porowska J, Sobkowska D, et al. Acne – therapeutic challenges to the cooperation between a dermatologist and a cosmetologist. Adv Dermatol Allergol 2021; 38: 21-31.
3. Lee YJ, Lee CY, Shin MK. A neglected acne scar type: papular acne scars and their correlations with keloid scars. Dermatol Surg 2021; 47: 1347-51.
4. Connolly D, Vu HL, Mariwalla K, Saedi N. Acne scarring – pathogenesis, evaluation, and treatment options. J Clin Aesthet Dermatol 2017; 10: 12-23.
5. Eichenfield DZ, Sprague J, Eichenfield LF. Management of acne vulgaris: a review. JAMA 2021; 326: 2055-67.
6. Bandral MR, Padgavankar PH, Japatti SR, et al. Clinical evaluation of microneedling therapy in the management of facial scar: a prospective randomized study. J Maxillofac Oral Surg 2019; 18: 572-8.
7. Pile HD, Sadiq NM. Isotretinoin. [Updated 2022 May 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan. Available from: https://www.ncbi.nlm.nih.gov/books/NBK525949/
8. Alam M, Dover JS; ASDS Dermatologic Surgery Lexicon Task Force. American Society for Dermatologic Surgery dermatologic surgery drug and device nomenclature recommendations. Dermatol Surg 2013; 39: 1158-66.
9. Dadkhahfar S, Robati RM, Gheisari M, Moravvej H. Subcision: indications, adverse reactions, and pearls. J Cosmet Dermatol 2020; 19: 1029-38.
10. Chuang GS, Alfaresi F. Regional dermabrasion of nasal surgical scars and rhinophyma using electrocautery scratch pads. Dermatol Surg 2018; 44: 300-2.
11. Gold M, Andriessen A, Cohen JL, et al. Pre-/postprocedure measures for laser/energy treatments: a survey. J Cosmet Dermatol 2020; 19: 289-95.
12. Atiyeh BS, Abou Ghanem O, Chahine F. Microneedling: percutaneous collagen induction (PCI) therapy for management of scars and photoaged skin-scientific evidence and review of the literature. Aesthetic Plast Surg 2021; 45: 296-308.
13. Fernandes D, Signorini M. Combating photoaging with percutaneous collagen induction. Clin Dermatol 2008; 26: 192-9.
14. Ablon G. Safety and effectiveness of an automated microneedling device in improving the signs of aging skin. J Clin Aesthet Dermatol 2018; 11: 29-34.
15. Clark AK, Saric S, Sivamani RK. Acne scars: how do we grade them? Am J Clin Dermatol 2018; 19: 139-44.
16. Torzecka J, Dziankowska-Bartkowiak B, Gerlicz-Kowalczuk Z, Wozniacka A. The use of isotretinoin in low doses and unconventional treatment regimens in different types of acne: a literature review. Adv Dermatol Allergol 2017; 34: 1-5.
17. Kim ST, Lee KH, Sim HJ, et al. Treatment of acne vulgaris with fractional radiofrequency microneedling. J Dermatol 2014; 41: 586-91.
18. Kim H, Ahn KJ, Lee S, et al. Interactive thermal tissue reactions of 7-MHz intense focused ultrasound and 1-MHz and 6-MHz radiofrequency on cadaveric skin. Skin Res Technol 2019; 25: 171-8.
19. Kroepfl L, Emer JJ. Combination therapy for acne scarring: personal experience and clinical suggestions. J Drugs Dermatol 2016; 15: 1413-9.
20. Araújo AR, Soares VP, Silva FS, Moreira Tda S. Radiofrequency for the treatment of skin laxity: mith or truth. An Bras Dermatol 2015; 90: 707-21.
21. Kruglikov IL. Assessment of mechanical stress induced by radiofrequency currents on skin interfaces. Biomed Res Int 2021; 2021: 6623757.
22. Kositratna G, Hibert ML, Jaspan M, et al. Effects of deviation from focal plane on lesion geometry for ablative fractional photothermolysis. Lasers Surg Med 2016; 48: 555-61.
23. Wat H, Wu DC, Chan HH. Fractional resurfacing in the Asian patient: current state of the art. Lasers Surg Med 2017; 49: 45-59.
24. Azzopardi EA, Duncan RT, Kearns M, et al. Cutaneous laser surgery for secondary burn reconstruction: cost benefit analysis. Burns 2020; 46: 561-6.
25. Kim ST, Lee KH, Sim HJ, et al. Treatment of acne vulgaris with fractional radiofrequency microneedling. J Dermatol 2014; 41: 586-91.