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A Case Report of Concurrent Acne-Related Occurrence Complications: Telangiectasia, Post-Inflammatory Erythema, Post-Inflammatory Hyperpigmentation, and Atrophic and Hypertrophic Scars

—Simultaneous Acne-Related Occurrence Complications

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Abstract

Prior to his initial diagnosis, a 21-year-old male had been experiencing facial acne for two years and had been treated by a doctor in private practice. The patient visited our department because the clinical manifestations of mandibular acne did not improve. At the time of initial examination, telangiectasia (TE), post-inflammatory erythema (PIE), post-inflammatory hyperpigmentation (PIH), atrophic scars (ASs), and a hypertrophic scar (HS) with induration were observed on the right neck. We diagnosed this as an acne vulgaris complication. HS lesions were topically treated by injecting triamcinolone acetonide, and the patient was prescribed 8.1 g/day of oral Saireito (Japanese herb). Adapalene benzoyl peroxide gel and topical tacrolimus hydrate ointment were used to treat PIE and TE. Both HSs and PIE improved; however, TE and AS did not improve. Currently, the patient is under observation. We consider this to be a very rare concurrent occurrence of diverse complications of acne vulgaris, and present the following case study.

Keywords

Acne Vulgaris, Acne-Related Concurrent Occurrence Complications, Telangiectasia, Atrophic Scar, Hypertrophic Scar

1. Introduction

Acne vulgaris is an inflammatory disease affecting the follicular and sebaceous

glandular units of the face, chest, and back. It typically occurs after puberty and resolves independently. The pathogenesis of this disease is as follows: first, sebum is excessively secreted from the sebaceous glands under the influence of androgens, clogging the follicles and resulting in micro-comedones [1]. Later, as *Cutibacterium acnes* proliferated in the follicular channel, closed comedones (whiteheads) or open comedones (blackheads) emerge, resulting in red papules and pustules [1]. The destruction of epidermal and dermal tissues may be complicated by atrophic scarring (AS) or hypertrophic scarring (HS) caused by excessive fibroblast proliferation. When cysts, nodules, or subcutaneous fistulas develop, lesions become intractable. Several complications are associated with acne.

Acne scars are classified into four grades: I, macular; II, mild; III, moderate; and IV, severe [2]. Post-inflammatory erythema (PIE) and post-inflammatory hyperpigmentation (PIH) are macular scars, while HS is a moderate scar. The pathogeneses of PIE, PIH, AS, and HS are complex and unclear. PIE subsides very slowly with time; however, in some cases, complete clearance cannot be accomplished [3]. After clearance of inflammatory acne, PIE may involve telangiectasia (TE) and erythematous papules [4]. Histopathologically, PIE is caused by concentration in minor blood vessels [5]. However, the pathological mechanisms underlying PIE remain unclear. After PIE resolution, PIH may appear as brown macules at the sites of acne lesions. Histopathology shows excessive melanin and dermal pigmentation. The degree of PIH depends on the severity of inflammation and basal/epidermal injury. Although the pathogenesis of PIH is not fully understood, increased PG, leukotriene, and cytokine levels are considered responsible for its occurrence [6].

AS and HS may also be observed. AS refers to tissue loss, whereas HS refers to the hypertrophic accumulation of dermal collagen [7]. Hypertrophic scars are most common on the jaw angle, upper back, and chest [7]. The jaw angle is defined as the tension area. The pathogenesis of scar formation may depend on the depth of the inflammatory acne lesions. Nodulocystic acne often coincides with HS [7].

To the best of our knowledge, the complication of TE in patients with acne vulgaris has not been reported. Concurrent complications, such as TE, PIE, and HS, are rare. Herein, we report a case of acne with multiple concurrent acne complications.

2. Case Report

Before visiting our department, a 21-year-old male had been experiencing facial acne for two years. The patient was treated with oral and topical antimicrobials and benzoyl peroxide (BPO) formulations for several years. However, the clinical findings did not respond to these treatments.

He visited our department because the acne lesions on his mandible did not improve. Clinical manifestations included concurrent diverse lesions, such as

TE, PIE, PIH, AS, and HS, from the mandible to the neck. Three linear, subcutaneously elevated HS indurations, PIE, AS, and TE were observed on the right side of the neck (Figure 1).

The patient was diagnosed with acne vulgaris complications, including TE, PIE, PIH, AS, and HS. Triamcinolone acetonide was topically injected into the HS area for three months. Additionally, 8.1 g/day of oral Saireito and topical adapalene benzoyl peroxide gel were administered. Topical tacrolimus ointment was applied to the PIE and TE. After treatment, the elevated HS flattened with significant improvement (Figure 2) and the PIE resolved into PIH (Figure 2). However, the TE and atrophic depigmented scars did not improve (Figure 2). The clinical manifestation of acne vulgaris in the patient was controlled.

Informed consent was obtained from the patient for reproduction of the clinical findings for publication.

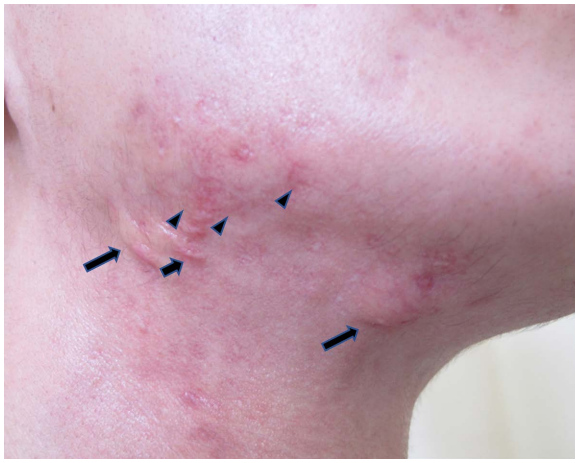

Figure 1. Three elevated HS lesions, AS, diffuse PIE, and TE were observed. HS (arrow) and TE (arrowhead) were observed before the treatment. PIE was observed at the right side of the mandibular area.

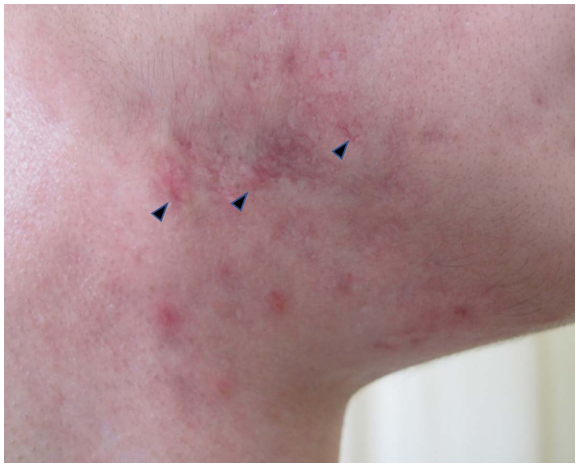

Figure 2. HSs were flattened with improvement after triamcinolone acetonide injection. TE was not improved by topical tacrolimus ointment (arrowhead). PIE was improved into PIH by topical tacrolimus ointment.

3. Discussion

AS, HS, PIE, and PIH are complications associated with acne vulgaris. To the best of our knowledge, TE has not been previously reported as a complication of acne. PIE may refer to TE [4] [5]. In this case, we encountered concurrent complications, including AS, HSs, PIE, PIH, and TE. We also report TE as an acne vulgaris complication for the first time.

There are several forms of acne scarring. Acne scar pathogenesis is complex. Acne scars are associated with inflammatory processes, angiogenesis, immunological processes, dermal and subcutaneous fibrosis, and hypertrophy. Topical corticosteroid injections are the mainstay of HS treatment [8]; their application was successful in the present case. The recurrence rate was reported to be 3% at four years [8]. Silastin gel sheets and laser therapy are other options [7]. ASs are classified into three types: boxcar, rolling, and ice pick scars [9]. PIE is a refractory complication of acne vulgaris and one of the most important complications that may result in scarring [10]. PIE is resistant to both topical and oral drugs [11].

Topical tranexamic acid has been used to treat PIE [11]. Vascular laser therapy is also useful for the treatment of PIE. This is because light sources are well targeted for red changes [12]. Therefore, dermabrasion, laser resurfacing, radiofrequency, subscision, skin needling, punch technique, chemical peeling, soft tissue augmentation, intralesional therapy, cryosurgery, and silicon decompression are used as cosmetic therapies for acne scarring [13]. Fractional microneedling radiofrequency (FMR) is commonly used to treat acne-induced PIE [14]. FMR induces dermal structure remodeling and decreases sebaceous gland activity. It also decreases nuclear factor-κB, interleukin-8, and vascular endothelial growth factor levels, resulting in the modulation of inflammatory and vascular components and inhibition of neovascularization and residual erythema [14].

Intense-pulse lasers are widely used to treat skin pigmentation and vascular diseases [4]. This treatment targets porphyrin, melanin, hemoglobin, and water. Therefore, it is effective for treating PIE and PIH in patients with acne. The effectiveness of pulsed-dye lasers is attributed to their ability to target hemoglobin and small vascular processes [4]. Q-switched laser is an alternative treatment for PIE [4]. Conventional treatments, such as chemical peeling, are also effective for PIE and PIH [6].

In the present case, conservative nonsurgical treatment was initiated. Topical tacrolimus hydrate ointment is effective for the treatment of PIE. To reduce the inflammation caused by PIE, topical tacrolimus treatment may be effective in preventing AS formation. It is also effective for the treatment of rosacea [15]. Tacrolimus hydrate ointment, which is usually used to treat atopic dermatitis, suppresses T-cell activation by inhibiting the calcineurin/NF-AT system, the production of cytokines such as interleukin-2 and interferon, and the induction of cytotoxic T cells, resulting in immunosuppressive effects [16]. It has also been reported to inhibit vascular endothelial growth factor and angiogenesis and is

effective against inflammatory erythema from acne [17]. In this case, the TE and ASs improved with topical tacrolimus application. However, TE caused by acne has not been previously reported.

Further case reports are necessary to clarify the pathogenesis involved.

4. Conclusion

A case report of acne-related concurrent complications such as telangiectasia, post-inflammatory erythema, post-inflammatory hyperpigmentation, and atrophic and hypertrophic scars was treated with topical corticosteroid injections and topical tacrolimus ointment.

Ethics Statement

Informed consent was obtained from the patients for inclusion in the study and publication of their images.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Kurokawa, I., Layton, A. and Ogawa, R. (2021) Updated Treatment for Acne: Targeted Therapy Based on Pathogenesis. *Dermatologic Therapy*, **11**, 1129-1139. https://doi.org/10.1007/s13555-021-00552-6

[2] Goodman, G.J. and Baron, J.A. (2006) Postacne Scarring: A Qualitative Global Scarring Grading System. *Dermatologic Surgery*, **32**, 1458-1466. https://doi.org/10.1111/j.1524-4725.2006.32354.x

[3] Park, K.Y., Ko, E.J., Seo, S.J. and Hong, C.K. (2014) Comparison of Fractional, Nonablative, 1550-nm Laser and 595-nm Pulsed Dye Laser for the Treatment of Facial Erythema Resulting from Acne: A Split-Face, Evaluator-Blinded, Randomized Pilot Study. *Journal of Cosmetic and Laser Therapy*, **16**, 120-123. https://doi.org/10.3109/14764172.2013.854626

[4] Kalantani, Y., Dadkhahfar, S. and Etesami, I. (2022) Post-Acne Erythema Treatment: A Systematic Review of the Literature. *Journal of Cosmetic Dermatology*, **21**, 1379-1392. https://doi.org/10.1111/jocd.14804

[5] Wu, X., Wang, X., Wu, X., *et al.* (2022) Intense Pulsed Light Therapy Improves Acne-Induced Post-Inflammatory Erythema and Hyperpigmentation: A Retrospective Study in Chinese Patients. *Dermatologic Therapy*, **12**, 1147-1156. https://doi.org/10.1007/s13555-022-00719-9

[6] Kurokawa, I., Oiso, N. and Kawada, A. (2017) Adjuvant Alternative Treatment with Chemical Peeling and Subsequent Iontophoresis for Postinflammatory Hyperpigmentation, Erosion with Inflamed Red Papules and Non-Inflamed Atrophic Scars in Acne Vulgaris. *The Journal of Dermatology*, **44**, 401-405. https://doi.org/10.1111/1346-8138.13634

[7] Layton, A., Thiboutot, D. and Bettoli, V. (2004) Acne, Fast. Health Press, London.

[8] Layton, A., Yip, J. and Cunliffe, W.J.A. (1994) Comparison of Intralesional Triamcinolone and Cryosurgery in the Treatment of Acne Keloids. *British Journal of*

Dermatology, **130**, 498-501. https://doi.org/10.1111/j.1365-2133.1994.tb03385.x

[9] Jacob, C.I., Dover, J.S. and Kaminer, M.S. (2001) Acne Scarring: A Classification System and Review of Treatment Options. *Journal of the American Academy of Dermatology*, **45**, 109-117. https://doi.org/10.1067/mjd.2001.113451

[10] Tan, J., Bourdès, V., Bissonnette, R., *et al*. (2017) Prospective Study of Pathogenesis of Atrophic Acne Scars and Role of Macular Erythema. *Journal of Drugs in Dermatology*, **18**, 567-573.

[11] Jakhar, D. and Kaur, I. (2020) Topical 5% Tranexamic Acid for Acne Related Post-inflammatory Erythema. *JAAD Online*, **82**, e187-e188. https://doi.org/10.1016/j.jaad.2019.09.074

[12] Innocenzi, D. and Proietti, I. (2010) Treatment Algorithm for Acne Scars. In: Tosti, A., *et al*., Eds., *Acne Scars*: *Classification and Treatment*, Informa Health, London, 110-123.

[13] Lanoue, J. and Goldenberg, G. (2015) Acne Scarring: A Review of Cosmetic Therapies. *Cutis*, **95**, 276-281.

[14] Min, A., Park, A.Y., Yon, J.Y., Kwon, H.H. and Suh, D.H. (2016) Fractional Microneedling Radiofrequency Treatment for Acne-Related Post-Inflammatory Erythema. *Acta Dermato-Venereologica*, **96**, 87-91. https://doi.org/10.2340/00015555-2164

[15] Bamford, J.T., Elliott, B.A. and Haller, I.V. (2004) Tacrolimus Effect in Rosacea. *Journal of the American Academy of Dermatology*, **50**, 107-108. https://doi.org/10.1016/S0190-9622(03)02157-1

[16] Wang, Y., Yang, S., Wu, L. and Tu, P. (2009) Topical Tacrolimus Suppresses the Expression of Vascular Endothelial Growth Factor and Insulin-Like Growth Factor-1 in Late Anagen. *Clinical and Experimental Dermatology*, **34**, e937-940. https://doi.org/10.1111/j.1365-2230.2009.03339.x

[17] Mhatre, M., Sharma, A. and Agrawal, S. (2022) Topical Tacrolimus for Acne-Related Macular Erythema to Prevent Atrophic Scarring. *Journal of the American Academy of Dermatology*, **86**, e253-e254. https://doi.org/10.1016/j.jaad.2020.06.077