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ORIGINAL ARTICLE

Update on Truncal Acne: A Review of Treatments for a Neglected Disease and the Re-Emergence of Tazarotene

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ABSTRACT

Acne vulgaris of the trunk carries with it a major psychosocial impact and an unmet need for adequate management. Approximately 50% of patients with facial acne also exhibit involvement of the back, chest, and/or upper arms. The trunk poses a therapeutic challenge given its occlusion by clothing, the tendency for mechanical rubbing, a sebum physiology that differs from the face, as well as the fact that there is a large surface area for topical therapies to cover. Furthermore, truncal acne is underreported for a variety of reasons such as cultural barriers, sentiments of embarrassment, and prioritization of facial acne. To date, few medications have been studied specifically for truncal acne. In this article, an updated review of truncal acne and available therapies is provided. The most recent evidence for tazarotene, a third-generation retinoid previously approved for psoriasis and facial acne vulgaris over two decades ago, is also reviewed and compared to trifarotene, a fourth-generation retinoid that is the only approved tropical retinoid for both facial and truncal acne.

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INTRODUCTION

Acne vulgaris is among the most common skin diseases worldwide with a prevalence estimated to be 9.4% of the global population.[1] The psychosocial impact of acne is significant and can negatively impact quality of life (QoL), especially in adolescents and teens.[2] Its pathogenesis has been well established, and a variety of treatments have been developed including numerous medications and procedures such as chemical peels and lasers. Prompt initiation of treatment that is appropriate for the severity of disease is critical to avoid disfiguring scars and pigmentary changes as well as psychological morbidity.

While facial acne has been extensively addressed in the medical literature, truncal acne has been given little emphasis.[3] Truncal acne poses multiple challenges both from therapeutic and quality-of-life perspectives. The larger surface area of involvement on the trunk relative to the face lends difficulty to topical treatments with respect to dosing, formulations, ease of application, and tolerability of adverse effects such as irritation due to being under clothing — all which lead to reduced compliance. It is also underreported as many patients tend not to voluntarily report their truncal acne, likely resulting in undertreatment and continued disease burden. There have also

been consensus gaps in recommendations for the assessment and grading of truncal acne with no "gold standard" severity grading tool that is independent of facial acne severity.[4] To date, only 1 topical retinoid with truncal clinical results has been approved by the US Food and Drug Administration specifically for truncal acne.[5] There is a need for further studies focused on truncal acne and its treatment. This article serves to highlight salient points of truncal acne with regard to its epidemiology, impact on QoL, pathophysiology, and treatments.

EPIDEMIOLOGY

Truncal acne remains underdiagnosed/undertreated and has historically been neglected in scientific investigation.[6] Current statistics likely underestimate the true prevalence of the disease, and the number of epidemiological studies are limited.[3] In a study of 696 adolescent patients ages 14 to 20 years, ~50% with facial acne also presented with truncal acne, while only 3% of patients had truncal-only acne.[7] A cohort study of 965 patients revealed a prevalence of acne on the back and chest to be 61% and 45%, respectively.[8] A population-based study of 2,200 adolescents in Brazil, aged 18 years, revealed a high prevalence of truncal acne (back or chest) with ~81% of all adolescents affected (chest or back).[9] In a prospective observational international study of 2,926 adult female patients with facial acne, aged over 25 years, ~48% also suffered from truncal acne.[10] A cross-sectional study in Turkey of 295 pregnant females aged over 18 years found the severity of truncal acne to be greatest during the third trimester than at any other stage.[11]

In addition, there appears to be a gender predilection with males being more affected by truncal acne than females.[7] This is likely overestimated as there are challenges to identifying truncal acne due to the reluctance of some patients to reveal parts of their bodies for numerous reasons (ie, cultural barriers or shame).[12] Notably, barring the Turkish study by Kutlu et al, there is also no mention of the severity of truncal acne in any epidemiological study. As it stands, there is a great need to better characterize the epidemiology of truncal acne globally and to also integrate disease severity into these assessments.

QUALITY OF LIFE

Truncal acne distinctly impacts QoL.[13] While QoL studies have traditionally focused on facial acne, there has been a recent push for studies focusing on the burden of truncal acne alone or in combination with facial acne. Poorer self-esteem has been associated with more severe acne on the back or chest.[14] This was confirmed in a subsequent study where both males and females who rated their back acne more severely had greater sexual and bodily self-consciousness of appearance.[15] Interestingly, while there was an association between men's self-esteem and truncal acne, self esteem was not significantly associated with facial acne severity. An international cross-sectional survey of 1,309 patients using the acne-specific Comprehensive Quality-of-Life Measure for Facial and Torso Acne (CompAQ), which is the only acne QoL measure that specifies the trunk, revealed that patients with both facial and truncal acne were twice as likely to report a significantly greater impact on QoL than those with facial acne alone.[16] Truncal acne severity also directly correlated with increased psychosocial morbidity irrespective of facial acne severity. Interviews with a subset of patients who had combined facial and truncal acne (N=694) revealed that about 50% reported feelings of embarrassment, self-consciousness, and low confidence.[17] Furthermore, approximately 10% of patients with truncal acne exhibit scarring, further impacting QoL.[7] It is clear that there is both a physical and psychological burden of truncal acne that leads to feelings of stigmatization, avoidance of social interaction, and depression.[18]

PATHOPHYSIOLOGY AND DIAGNOSIS OF TRUNCAL ACNE

Truncal acne is thought to be due to the same 4 major pathogenic mechanisms as facial acne, according to expert consensus opinion.[4] These include: (1) increased sebum production, (2) abnormal keratinization, (3) *Cutibacterium acnes* colonization of pilosebaceous unit, and (4) inflammation. Treatments are aimed at mitigating 1 or more of these mechanisms, and treatments that holistically address the greatest of components, such as retinoids, tend to be more efficacious and have longer-lasting remission. However, there does exist a physiologic difference in sebum production between the face and trunk that could theoretically give rise to differences in treatment response. Interestingly, sebum secretion is lower in truncal acne sites than facial acne sites, but no significant correlation was found between sebum secretion and truncal acne lesions.[19] This implies that mechanisms other than sebum production (ie, abnormal keratinization, inflammation, and *C. acnes* colonization) may have a predominant role in truncal acne pathogenesis. Truncal skin also has a lower pH than facial skin; yet there was no significant correlation between truncal sebum production and pH.[20] With regard to pH, it has been established that increased skin pH is associated with facial acne.[21-22] Increased pH is

thought to cause disrupted skin barrier function.[23] At this time, it is unclear how a more acidic or lower pH in truncal skin may contribute to acne development.

In addition to physiologic characteristics, the trunk is frequently under occlusion from clothing or sporting gear rendering truncal skin more affected by mechanical effects, such as trapped sweat/oils, pressure, and friction, than facial skin.[24] These contribute to comedone formation and inflammation. One pilot study in young males over 12 years of age with truncal acne revealed a trend toward acne exacerbation due to exercise-induced sweat 5 days per week for 2 weeks.[25] Statistical significance was not achieved, but this is likely due to the small sample size of the study (N=23).

TRUNCAL ACNE SEVERITY ASSESSMENT

Numerous tools have been developed to assess the severity of truncal acne, such as the Leeds technique and Physician Global Assessment (PGA).[5,26] These generally assess severity based on anatomic extent of disease and number of inflammatory/non-inflammatory lesions. One tool was also developed to assess the severity of acne scars on the face and trunk.[27] However, none have been suitable for daily clinical practice, nor have they incorporated the psychological and QoL impact of the overall severity of the disease. To address this, the truncal acne severity scale (TRASS) was recently developed and validated.[28] TRASS is a comprehensive assessment tool that goes beyond the classical scoring based on the presence, type, and area of lesions. It incorporates a patient's duration of acne, prior systemic acne treatment, family acne history, clinical signs such as nodules and scars, and anatomic location, as well as impact on QoL. TRASS is therefore the first acne severity assessment tool to combine global assessment with patient-centered metrics.

CURRENT TREATMENTS FOR TRUNCAL ACNE

Treatments that have generally been used for truncal acne have been adapted from facial acne. Some small studies have assessed their utility, but large controlled trials with truncal acne-specific efficacy endpoints have been lacking. The current evidence of the efficacy of these treatments for truncal acne are reviewed next (Table 1).

Antibiotics

Antibiotics serve a dual purpose in the treatment of acne given their anti-inflammatory and antibacterial effects. Topical antibiotics have been utilized for decades in the treatment of acne. A mainstay of treatment for acne is benzoyl peroxide (BPO). It is a potent antimicrobial agent effective for acne while also reducing the risk of antibiotic resistance. Its effectiveness in both facial and truncal acne is dependent on concentration and contact time with the skin. One study found short-contact

TABLE 1.

Treatments Used in the Management of Truncal Acne

Topical	Oral	Procedures
Antibiotics Benzoyl peroxide Clindamycin Erythromycin **Azeleic Acid** **Retinoids** Tazarotene Tretinoin Trifarotene **Dapsone** **Anti-Androgens** Clascoterone	**Antibiotics** Sarecycline Doxycycline Azithromycin Trimethoprim Erythromycin **Retinoids** Isotretinoin **Anti-Androgens** Oral contraceptives Spironolactone	**Chemical peels** **Intense Pulsed Light (IPL)** **Photodynamic therapy (PDT) + aminlolevulonic acid (ALA)**

therapy with BPO 9.8% foam reduced *C. acnes* counts on the back, whereas BPO 8% wash did not, which may be attributed to wash formulations likely not achieving adequate contact times.[29] Bikowski found BPO 5.3% foam used as leave-on or as short-contact therapy for 5 minutes to be effective in truncal acne patients.[30] A study assessing 40 patients with truncal acne of moderate severity treated with BPO 8% wash or BPO 9% cleanser over a 4-week period showed a reduction in inflammatory lesions of 37.23% and 30.19%, respectively, and non-inflammatory lesions of 28.03% and 25.23%, respectively.[31-32] BPO 8% wash in combination with clindamycin phosphate 1% foam also resulted in a mean total lesion count reduction of 70% in one study.[31] While effective, application of BPO on the torso can lead to bleaching of clothing and bedding; thus negatively impacting use by patients.

Other topical antibiotics also have been assessed. A split-trunk study in 1976 showed an improvement in number of active lesions with erythromycin 1% as well as clindamycin 1% twice daily monotherapies after at least 8 weeks of treatment.[33] A study assessing the effect of tetracycline twice daily on acne of the chest and back did not find any significant improvement.[34]

Oral antibiotics also are a staple for management of truncal acne, especially in the reduction of inflammatory lesions. One study showed efficacy of the macrolide azithromycin 250 mg 3 times per week over a 4-week period in patients with truncal acne who had shown poor results with prior regimens.[35] An open retrospective study assessed the effect of oral trimethoprim 300 mg twice daily along with topical clindamycin 1% lotion twice daily in 56 patients who failed to respond to a minimum of 2 courses of antibiotics. After at least 4 months of treatment, this combination led to an improvement of acne on the face, back, and chest.[36] A long-term 6-month interventional trial in 204 patients with predominately facial or truncal acne treated with oral erythromycin 1 g daily or minocycline 200 mg daily given in combination with topical benzoyl peroxide showed that both antibiotic regimens improved truncal acne, albeit to a significantly less extent than facial acne.[37] These results confirmed the earlier outcome by Greenwood et al who treated truncal acne patients with oral erythromycin for 6 months.[38] They found a dose-dependent response of erythromycin with a 1-g daily dosing to be superior to a 500-mg daily dosing, with females responding better than males. Few studies also assessed the benefit of oral minocycline but those that did found truncal acne to be less responsive than facial acne.[39] A single study investigated the use of oral doxycycline 100 mg twice daily either with BPO 9% cleanser and clindamycin 1% foam daily or BPO 9% cleanser only.[40]

Retinoids

Retinoids signal through retinoid acid receptors (RARs) and regulate transcriptional expression of numerous genes.[41] Regulation of gene expression changes is unique to which RARs/RXRs are engaged, and these effects have been studied across numerous skin cell types.[42-44] In general, retinoids exert anti-inflammatory effects, promote normal keratinization and keratinocyte differentiation, and regulate sebum production, thus impacting 3 of the 4 critical factors in acne pathogenesis.[45]

Goulden et al found intermittent use of oral isotretinoin 0.5 mg/kg/day for 1 week every 4 weeks for a total period of 6 months to be beneficial in truncal acne.[46] However, they found a higher relapse rate in patients with predominantly truncal acne compared to facial acne after 12 months. Cunliffe et al also found topical isotretinoin 0.1% cream to be efficacious after 4 weeks of treatment.[47]

Procedural Management

Non-medical interventions have also successfully been used for the management of acne vulgaris. These include chemical peels, light devices, and laser therapies.[48] Photodynamic therapy (PDT) has been assessed in patients with truncal acne.[49] One pilot study found benefit of a single treatment session of PDT (red light source at wavelength 630 nm) with 5% aminolevulinic acid (ALA) under occlusion for 3 hours for truncal acne in 15 Asian patients with an overall 64.2% and 24.3% reduction in inflammatory and non-inflammatory lesion counts, respectively.[50] Del Duca et al found PDT with 5% ALA to be of benefit when administered 4 times at 14-day intervals.[51] Fabbrochini et al also used red light PDT with 15% ALA to the back and chest at 2-week intervals in 3 sessions.[52] Another study performed a randomized split-body study of PDT using intense pulsed light (IPL) with liposomal methylene blue and found this combination to be superior to IPL alone on the back.[53] Similarly, IPL with a 560-nm cut-off filter and 5% ALA was found to be superior to IPL alone with monthly sessions over 3 months.[54] IPL monotherapy with cut-off wavelength of 400 nm over 4 sessions with 2-week intervals was also shown to be of benefit for patients with Fitzpatrick skin types II or III with moderate to severe acne of the chest and back.[55]

EFFICACY OF TREATMENTS OF TRUNCAL ACNE IN CLINICAL TRIALS

Interventional clinical trials for acne vulgaris with efficacy endpoints focusing on truncal acne have been lacking. Few medications have been studied in clinical trials utilizing truncal

acne-specific Investigator Global Assessment (IGA) scores. Their mechanisms of action and efficacies are reviewed next.

Azelaic Acid

Azelaic acid is a dicarboxylic acid that exhibits anti-inflammatory, anti-infective and skin lightening properties.[56] Three studies have assessed azelaic acid foam and cream for truncal acne. Hoffman et al performed a 16-week open-label study utilizing azelaic acid 15% foam in 18 patients and found that 44% achieved a rating of clear or almost clear.[57] Kainz et al also found improvement with azelaic acid 20% cream in a 12-week non-interventional study of 251 females.[58] A case series of four Black female patients with truncal acne also showed the effectiveness of combination therapy azelaic acid 15% foam and tretinoin 0.05% lotion.[59]

Dapsone

Dapsone (4,4′-diaminodiphenylsulfone) has numerous mechanisms of action.[60] It exhibits antimicrobial effects due to its ability to inhibit the synthesis of dihydrofolic acid. It is also anti-inflammatory through: (1) inhibition of reactive oxygen species production, (2) attenuation of the effect of eosinophil peroxidase on mast cells, and (3) down-regulation of neutrophil-mediated inflammatory responses. It has been approved in both 5% and 7.5% gel formulations for treating acne vulgaris.[61-62]

Only 1 study has been conducted assessing the efficacy of dapsone specifically for truncal acne. Del Rosso et al performed an open-label study of dapsone 7.5% gel once daily over 16 weeks in 20 subjects with moderate or severe truncal acne aged 12 years or older.[63] By week 16, 45% of subjects achieved the primary endpoint of a ≥ 2-grade improvement on IGA with a rating of clear or almost clear. There were also 74%, 69%, and 42% reductions in inflammatory, non-inflammatory, and total lesions, respectively.

Anti-Androgenic Therapies

Another therapeutic strategy for acne is to target the hormonal aspect. Acne is androgen-dependent, and anti-androgen therapies provide benefits. Oral contraceptives (OCPs) provide anti-androgen activity via two major mechanisms: (1) the estrogen component, which stimulates the synthesis of sex hormone binding globulin (SHBG) that in turn reduces the amount of biological active androgens, and (2) the progestin component, which blocks 5-alpha reductase activity to reduce the conversion of testosterone to dihydrotestosterone (DHT).[64,52] Only 1 study to date has assessed the use of OCPs in truncal acne.[65,53] In this randomized double-blind trial, female patients aged 18 to 45 years old with moderate truncal acne were treated with 3 mg drospirenone / 0.02 mg ethinyl estradiol or placebo over 24 weeks. The OCP group achieved an IGA success rate of 53.3% whereas the placebo group achieved 20%. Spironolactone also increases the synthesis of SHBG and exerts a beneficial anti-androgenic effect on acne. One retrospective study utilizing electronic medical records in a cohort of 110 patients revealed an improvement in chest and back acne by 75.9% and 77.6%, respectively.[66,54] A more recent retrospective study of 403 adult women treated for acne with spironolactone also revealed an improvement in chest and back acne by 84.0% and 80.2%, respectively.[67,55]

Clascoterone is a recently discovered androgen receptor inhibitor that acts against the androgenic component of acne. Its formulation as a topical cream has allowed males to utilize anti-androgen therapy with a significantly lesser concern for systemic off-target effects such as feminization or erectile dysfunction. Clascoterone 1% cream is the first topical androgen receptor inhibitor to be approved for clinical use, and it is currently approved for treatment of acne vulgaris in patients 12 years of age or older.[68-69] Two concurrent randomized, vehicle-controlled, double-blind, phase 3 studies (CB-03-01/25 and CB-03-01/26) containing a total of 1,440 subjects between the ages of 9 and 58 were conducted over 12 weeks with treatment success defined as IGA score of 0 (clear) or 1 (almost clear) on IGA and ≥2-grade improvement. Treatment with clascoterone 1% cream applied twice daily had statistically significant improvement compared to vehicle with 57% and 69% achieving treatment success in CB-03-01/25 and CB-03-01/26, respectively. Change from baseline in noninflammatory and inflammatory lesion counts at week 12 were also statistically significantly greater in the clascoterone treatment group with reductions of 30.6% and 29.3%, respectively in noninflammatory lesion counts and 44.8% and 46.9%, respectively, in inflammatory lesion counts. An open-label safety study of the patients who underwent the phase 3 trials for facial acne further demonstrated benefit for truncal acne.[70]

Sarecycline

Sarecycline is a novel tetracycline that was created specifically for the treatment of acne with a narrow spectrum targeting *C. acnes* over normal human intestinal microflora.[71-72] It is also the only oral tetracycline-class drug with reported truncal efficacy data.[73-74] Two concurrent double-blind, randomized phase 3 trials (SC1401 and SC1402) have been conducted in subjects between the ages of 9 and 45.[73] IGA scores were used to assess acne severity on the back and chest. A total of 2,002 subjects completed the study. Efficacy was determined as the percentage of patients with a ≥2-point decrease and a rating of clear or almost clear on IGA at week 12. With regard to the back, subjects who received oral sarecycline at a dose of 1.5 mg/kg/day had 32.9% and 33.2% efficacy rate compared to 17.1% and 25.7%

for placebo in SC1401 and SC1402, respectively. This outcome was also similar for the chest with 29.6% and 36.6% efficacy in the sarecycline group vs 19.6% and 21.6% in the placebo group. Pooled results by Del Rosso et al further showed that both chest and back IGA success rates were significantly greater vs placebo as early as week 3.[74]

Trifarotene

Trifarotene is a fourth-generation retinoid that is selective for retinoic acid receptor (RAR)-y. The 0.005% cream (Aklief) has been approved for the topical treatment of acne vulgaris in patients 9 years of age or older.[75] The phase 3 trials leading to approval of trifarotene were the first to evaluate the truncal acne reductions as an official endpoint using the PGA.[5] In two double-blind, randomized, vehicle-controlled studies of trifarotene cream applied once daily (PERFECT 1 and PERFECT 2), patients ages 9 years or older with moderate truncal acne (PGA score of 3) and ≥20 inflammatory lesions and 20 to <100 noninflammatory lesions were included. The co-secondary efficacy endpoints were defined as the percentage of subjects achieving a PGA rating of clear or almost clear and at least a 2-grade change from baseline to week 12 as well as absolute changes in truncal inflammatory and noninflammatory lesion counts from baseline to week 12. Across both trials, a total number of 1,198 patients received trifarotene cream, and 1,194 received vehicle cream. Truncal PGA success was achieved by 35.7% in PERFECT 1 and 42.6% in PERFECT 2 in the trifarotene group vs 25.0% and 29.9% for vehicle, respectively. Significantly greater reductions in inflammatory and noninflammatory lesion counts were also observed in the trifarotene treatment group compared to vehicle. A post-hoc analysis of these 2 trials focusing on adolescent patients aged 12 to 17 years old (N= 1,128) revealed success rates on PGA at week 12 to be 35.1% in the trifarotene group and 23.5% in the vehicle group with a statistically significant difference (P<0.001).[76] A 52-week, open-label, non-comparative trial of once-daily trifarotene cream for facial and truncal acne vulgaris was also conducted.[77] A total of 348 patients completed the study. PGA success rates for truncal acne were 38.6% at week 12, 58.4% at week 26, and 66.9% at week 52. Overall, it is evident that extended use of trifarotene results in greater success for truncal acne.

Tazarotene

In addition to trifarotene, tazarotene is a third-generation retinoid that targets RARβ and RARγ that was originally approved for plaque psoriasis 25 years ago.[78] Different topical formulations have been tested in patients with facial acne vulgaris with significant lesion reductions observed after 12 weeks of treatment with 0.045% lotion.[79-80] Its use specifically for truncal acne has recently been explored. Jarratt et al found good efficacy for tazarotene foam or gel for acne of the chest, upper back, and shoulders.[81] A single-center, open-label 12-week pilot study of tazarotene 0.045% lotion (Arazlo, Ortho Dermatologics) for truncal was recently conducted.[82] A total of 19 subjects (10 females, 9 males, aged 12 to 58 years) completed the study. Subjects with moderate severity of truncal acne (IGA 3) were included, and the primary endpoint was the percent of patients achieving ≥2-grade improvement on the IGA scale and achieving a final IGA score of clear or almost clear. At week 4, 21% of patients achieved clear/almost clear skin. By week 12, 89% of patients achieved the primary endpoint. In addition, there was a significant improvement in the Dermatology Life Quality Index (DLQI) from a mean of 4.2 at baseline of 1.7 at week 12. DLQI measurements were not included in any of the trifarotene studies to date.

While both tazarotene and trifarotene are topical retinoids with demonstrated efficacy against truncal acne, it is important to consider patient compliance as there are also difficulties in maintaining a topical treatment regimen over large surface areas such as the back and chest compared to the face. Tazarotene 0.045% lotion was developed in a unique optimized vehicle using polymeric emulsion technology where a 3-D mesh allows for a uniform distribution and moisturizing/hydrating agents.[83] Using this first-in-class vehicle technology, in the open-label study of 19 adults, 73% of subjects rated tazarotene 0.045% lotion as having excellent ease of use compared to previous topical therapies, 72% rated as excellent with regard to continuation of daily activities, and 59% rated as excellent with regard to large surface area application.[82] Sixty-five percent of patients also rated its spreadability as excellent. A single case of series of 3 subjects that assessed real-world patient satisfaction with application of trifarotene cream once daily for truncal acne also revealed high overall satisfaction and excellent tolerability.[84]

A recent double-blind, split-body study of 30 healthy adults aged 18 to 59 years further demonstrated the superior spreadability of tazarotene 0.045% lotion over trifarotene 0.005% cream.[85] A total 0.1 mL of each product was applied to a 10-cm wide area on 1 side of the back and pulled down the back until it could no longer spread, after which the area of spread was measured. The mean area of spread for tazarotene 0.045% lotion and trifarotene 0.005% cream were 167.0 cm^2 and 130.3 cm^2, respectively. On average, skin coverage with tazarotene lotion was ~30% greater than with trifarotene cream. This study was the first head-to-head comparison of topical retinoid spreadability and highlights the advantage of tazarotene's polymeric emulsion technology for vehicle formation. As such, patients may be more likely to use topicals with greater ease of use and spreadability, which could in turn increase compliance and achieve better outcomes.

In addition to ease of application, tolerability of treatments can affect compliance. In the trial utilizing tazarotene 0.045% lotion, erythema, dryness, peeling, oiliness, pruritus and burning were mostly absent or trace throughout the study.[82] On the other hand, trifarotene 0.005% cream caused mild to moderate skin dryness, erythema, scaling, stinging, and burning, with few subjects experiencing severe tolerability problems.[5]

CONCLUSION

Truncal acne, while similar to facial acne, requires a dedicated assessment due to its nuanced response to therapies and psychosocial burden. There has been an increased awareness of truncal acne as a neglected entity, and recent interventional studies have begun to focus on efficacy endpoints of the chest, back, and upper arms. While there have been some clinical trials that examined treatments for truncal acne, more research is needed. Furthermore, reformulation of efficacious drugs such as tazarotene in optimized vehicles for topical application is a promising therapeutic approach.

DISCLOSURES

Dr. Kircik has served either as an investigator, speaker, or consultant for Almirall, Cassiopea, Dr. Reddy's, Galderma, L'oreal, Ortho- Dermatologics, Pfizer & Sun Pharma.

Dr. Issa has no conflicts of interest to declare.

Dr. Draelos has been a researcher for Bausch and Galderma.

Dr. Tanghetti is a shareholder and Principle Investigator for Accure, a Speaker and Consultant for Ortho Dermatologics, and a Speaker for Galderma.

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