Guest Editorial

Is it Acne or Is it Rosacea? An Important Distinction

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Acne and rosacea are 2 of the most common diagnoses in a dermatology office. Although they have features in common, diagnostic distinction rarely is a clinical challenge. However, despite the relative ease of diagnosis, some clinicians believe that achieving a definitive diagnosis is unnecessary, as they tend to treat both conditions in a similar fashion. Part of the problem seems to be the continued use of the term *acne rosacea*. In conversations with clinicians, I have concluded that the term is used in several ways: as rosacea that appears similar to acne, presumably papulopustular rosacea; as a synonym for adult acne; or as rosacea that is not a distinct entity but rather a variant of acne. Others utilize the term to define patients who have both conditions simultaneously. It seems to be a widely held belief that acne and rosacea are common comorbidities; however, there are no data in the literature to support this impression. Regardless of the initial intentions for this term, it currently obfuscates the differential diagnosis of papulopustular eruptions on the face. So is making the differential an important distinction, and do we or should we care?

Pathophysiology and Clinical Presentation

Over the last decade, much headway has been made in our understanding of the etiology and pathophysiology of acne and rosacea. The 2 conditions are clinically and biochemically distinct. As the pathophysiology has been elucidated, we have received insight into why traditional medications are effective. Our treatment paradigms have been solidified or modified based on this information. Simultaneously, the last decade has seen undeniable evidence of the emergence of antibiotic resistance to "superbugs," and a worldwide call for good antibiotic stewardship has been issued.[1]

In scholarly reviews, acne and rosacea always are listed as differential diagnoses of each other. However, it is rare for the 2 conditions to present a clinical dilemma for a seasoned practitioner. The concern is that the differential is based on a compilation of several broad generalities rather than clear-cut diagnostic criteria. Rosacea *generally* is seen in older patients. It most commonly presents as lesions of the central face. Lesions on the back, chest, and upper arms are unusual. Papules and pustules often are present but comedones are rare. Rosacea often is accompanied by erythema of the central face and a tendency to flush or blush. There may be ocular involvement or phymatous changes. In contrast, acne *generally* is a condition affecting younger patients, though it often is seen in adult women. Comedones *generally* are present, truncal and arm lesions are common, erythema *generally* is limited to perilesional skin, and ocular involvement and phymatous changes are not characteristic.

Long believed to be primarily infectious disorders, recent investigation has demonstrated that both acne and rosacea have an inflammatory component to their pathogenesis.[2] In rosacea, researchers have found dysregulation of the natural immune response of the skin, producing chronic inflammation. The upregulation of cathelicidins, antimicrobial peptides that are important in the innate immune system, result in recruitment of immune cells and angiogenesis.[3-5] Increased matrix metalloproteinases, nitric oxide, and reactive oxygen species result in chronic ongoing dermal degradation.[6] Acne has a multifactorial pathophysiology that includes follicular hyperproliferation and hyperkeratinization as well as androgen stimulation of sebocytes. The role of *Propionibacterium acnes* in the inflammatory process has been elucidated, and it has been shown to trigger the toll-like receptor pathway, resulting in the production of proinflammatory mediators.[7-9] The inflammatory process also has been shown to be part of the tendency for hyperpigmentation and scarring in acne.[10,11]

Treatment

These observations have helped us to understand that many of our commonly used medications modulate the inflammatory process in both diseases, albeit by subtly different mechanisms. In rosacea, the tetracycline antibiotics downregulate proinflammatory cytokines, decrease the production of matrix

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metalloproteinases, and indirectly reduce nitric oxide and reactive oxygen species.[12,13] Both azelaic acid and metronidazole have been shown to reduce neutrophil production of reactive oxygen species, and azelaic acid downregulates the aberrant production of cathelicidins present in rosacea.[14-16] In acne, tetracycline antibiotics reduce *P acnes* colonization, but they also reduce inflammation by decreasing neutrophil chemotaxis, matrix metalloproteinase 9, and proinflammatory cytokines.[17] Retinoids also are anti-inflammatory by several mechanisms including reduction of the expression of toll-like receptor 2.[18]

Antibiotic resistance is a worldwide growing concern. A review of the literature shows that the prevalence of tetracycline resistance has dramatically risen on a global scale.[19,20] *Propionibacterium acnes* resistance to erythromycin has sufficiently risen so that it is no longer a viable therapeutic option for acne therapy.[21,22] Conclusive data have prompted the director of the Centers for Disease Control and Prevention to call antibiotic resistance "one of the world's most pressing public health threats."[23] The Centers for Disease Control and Prevention estimates that half of antibiotic prescriptions written each year are unnecessary (100 million total prescriptions). Their recommendations for appropriate antibiotic use include the following: (1) only prescribe antibiotics when the diagnosis of bacterial infection is confirmed and they are likely to be of benefit to the patient; (2) use an agent that specifically targets the likely pathogen; and (3) use the appropriate dose and duration of the antibiotic. However, dermatologists in the United States prescribe 3 to 4 million topical antibiotics and 8 to 9 million oral antibiotics per year for both infectious and inflammatory diseases, and most are tetracycline antibiotics.[24] Because a bacterial pathogenesis for rosacea has not been demonstrated, guidelines for treatment from the American Acne and Rosacea Society are to utilize therapy that targets the inflammatory nature of rosacea. These guidelines include utilizing the following topical and oral agents approved as first-line therapy for the treatment of rosacea: azelaic acid, metronidazole, sodium sulfacetamide–sulfur, and anti-inflammatory doxycycline.[25]

Conclusion

Is the differential diagnosis of acne versus rosacea one that merits our attention and concern? Is it an important distinction clinically and therapeutically? Current data obtained from a multitude of sources support the concept that the 2 conditions are clinically and pathophysiologically distinct. Rosacea is a chronic inflammatory disorder with neurovascular dysregulation. Acne, a distinct entity, has hormonal, infectious, and inflammatory components. Available treatments for the 2 conditions have some overlap; however, over the last decade treatment paradigms have shifted as our knowledge of the mechanism of action of traditionally used medications has crystallized. The enormity of the problem of antibiotic resistance has led us to reconsider or limit the use of antibiotics in both conditions, especially in rosacea in which no bacterial entity exists. Therefore, distinguishing the 2 conditions is of great importance in 2012 as we attempt to improve the health of our patients while minimizing ecologic mischief. The time to be cavalier has passed.

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