Preliminary Report

The Use of Salicylic Acid in a New Delivery System as a Co-Adjuvant Topical Treatment for Acne Vulgaris

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Background: Topical preparations in the form of creams or ointments are the usual treatment for acne. These agents do not seem to penetrate the skin barrier deeply enough to produce the desired effect.

Objective: We conducted a randomized, double-blinded, prospective study to evaluate the effectiveness of salicylic acid in a new delivery system, the Crown Carrier System (CCS, Trivitaderm LLC, Asheville, NC) for the treatment of acne.

Methods: Thirty-seven patients with homogenous backgrounds were randomly divided into 3 groups. Group A was treated with salicylic acid in CCS, Group B was treated with CCS without salicylic acid, and Group C received salicylic acid alone. Patients were evaluated at 2 weeks and 8 weeks post-treatment.

Results: Twenty-five patients completed the evaluation. Most patients in Group A presented with no changes in the number of acne lesions but with significant improvement of inflammatory signs. Their overall skin condition was remarkably better.

Conclusions: Our study is unique in that it focused on the delivery system used in the treatment of acne, rather than on the active agent. The technology of the Crown Carrier System appears to be a breakthrough that may give physicians the opportunity to administer topical treatment of skin problems in a more efficient way. (Aesthetic Surg J 2005;25:40-43.)

Although as many as 80% of adolescents and young adults present with one or more episodes of acne, the problem is not limited to younger patients and can be present in any age, racial, or gender group. The literature about acne is abundant, with more than 8816 papers listed in MEDLINE alone and more than 840,000 acne-related sites on the Internet. However, there is no single universally successful treatment.

Topical preparations constitute the majority of the treatment programs. Although numerous active agents are available on the market, the usual vehicle is still a cream or ointment, the same basic concept first developed by Galen in 200 AD. These agents do not seem to penetrate the skin barrier deeply enough to produce the desired effect.

The Crown Carrier System (CCS, Trivitaderm LLC, Asheville, NC) is a new delivery system based on a supramolecular substrate chemistry that organizes carrier molecules and substrates (host-guest complexes) so as to create the conditions for trans-membrane transfer of the substrate (active agent-guest). This is accomplished through a process known as molecular recognition, through which one molecule recognizes a chemical attachment point on another molecule. This facilitates carrier-mediated transfer across membranes through a “catch and release” process involving formation of the carrier-substrate complex, diffusion of the complex through the membrane, release of the substrate, and back diffusion of the free carrier (Figure 1, A and B). The mechanism of penetration is based on increasing skin permeability. (Figure 1, C).

We conducted a randomized, double-blinded, prospective study to assess acne improvement and tolerability during 8 weeks of treatment with salicylic acid 2% in the CCS delivery system versus a nonmedicated sus-
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**Figure 1.** A, B, Diagrams of the CCS molecule in a “catch and release” process. C, Increased permeability of the cell wall allows the transport of the active agent-guest.

**Figure 2.** A, Pretreatment view of a 22-year-old female patient. Facial skin shows inflammatory papule and pustule acne. Excess skin oil, generalized erythema, and presence of nodular cystic acne. B, Eight-week post-treatment view shows improvement of overall skin condition.

**Figure 3.** A, Pretreatment view of an 18-year-old male patient. Facial skin shows inflammatory papule and pustule. B, Two-week post-treatment view shows improvement of inflammation.
pension control and a third suspension with salicylic acid alone, denoted as products A, B, and C, respectively.

**Methods**

Study participants were selected from patients at an outpatient facility in a small rural area. The 37 patients in the study were white and came from similar backgrounds, lived under similar environmental conditions, and were treated through the same or similar medical-care structure. They were randomly divided into 3 groups, in an alternated and blinded fashion. Patients in Group A received salicylic acid in CCS, Group B received CCS without salicylic acid, and Group C received salicylic acid alone. Patients were instructed to use the products daily. All the individuals received the same cleanser and moisturizer with sun protection.

The evaluation was based on the total lesion counts and the subjective evaluations made by the patients and the physicians in a linear rating scale: much worse (−2), worse (−1), same (0), better (1), much better (2). Evaluations were performed at the initial visit and at 2 and 8 weeks. The documentation was performed by physical examination and by digital photography under identical conditions.

**Results**

The follow-up and evaluation were completed in 25 patients. In Group A (salicylic acid in the CCS), 7 patients
presented with an improved or unchanged clinical condition (28%) and 2 patients presented with worsened acne (8%). In group B (CCS delivery system without the salicylic acid), 4 patients presented with clinical improvement (16%) and 5 patients presented with worsened acne (20%). In Group C, (salicylic acid alone), 3 patients experienced improvement (12%) and 4 patients experienced worsened acne (16%). Despite some cases showing clinical improvement during the 8-week evaluation period, the post-treatment lesion counts did not vary significantly from pretreatment lesion counts in any of the 3 groups. Most patients in Group A presented with no change in the number of acne lesions but with significant improvement of inflammatory signs (Figure 2). Their overall skin condition was remarkably better (Figure 3). Two patients with rosacea also showed significant improvement (Figure 4).

Conclusion

While there are effective agents for treatment of the inflammatory process of the skin, a delivery system that can effectively penetrate the skin barrier is needed. The technology of the Crown Carrier System appears to be a breakthrough that may give us the opportunity to administer topical treatment of skin problems in a more efficient way. Although this study focused on treatment of acne, we have also begun to study results in other skin processes, such as psoriasis, rosacea, and milia. The results with respect to psoriasis deserve careful evaluation due to the remarkable improvement (Figure 5).

Our study is unique in that it focused on the delivery system, rather than on the active agent. Despite the small sample size, the homogeneity of the study group lends greater significance to the results. Further studies will be necessary to define the value of the CCS. We will report on our continued follow-up.

Suggested Readings


Lehn JM. Programmed chemical systems: multiple subprograms and multiple processing/expression of molecular information. Chemistry (Germany) 2000;5:2097-2102.


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