Optimized Formulation for Topical Application of a Fixed Combination Halobetasol/Tazarotene Lotion Using Polymeric Emulsion Technology

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SYNOPSIS
- Halobetasol propionate (HP) and tazarotene (TAZ) work in concert for plaque psoriasis yet are limited by side effects.
- The unique formulation of HP/TAZ lotion technology allows for a uniform and sustained dermal delivery of active ingredients.

OBJECTIVES
- To describe the unique formulation approach with HP/TAZ technology.
- To assess the absorption and epidermal barrier effects of the novel formulation of HP/TAZ lotion compared to expected individual results with HP and TAZ.

METHODS
Polymeric Emulsion Technology Formulation

HP and TAZ are encapsulated within a novel oil-in-water emulsion with moisturizing hydrating excipients to light internal oil, oil-in-water emulsion (Figure 1).

OIL-IN-WATER EMULSION

Halobetasol and Tazarotene Each oil droplet contains water-soluble and oil-soluble excipients within the polymeric matrix. Other water-soluble excipients are trapped within the 3-D matrix (mesh) plus oil-soluble excipients.

RESULTS

Percutaneous Absorption
- The polymeric emulsion technology used to formulate HP/TAZ lotion demonstrated higher percutaneous permeation efficiency of active ingredients into the dermal layers than either HP 0.05% cream (Figure 2A) or TAZ 0.1% cream (Figure 2B) alone.

Percutaneous Absorption

- The advantage of substantial and uniform delivery of HP/TAZ using this formulation was apparent when it was shown that simply layering TAZ 0.1% cream onto HP 0.05% cream decreased the percutaneous permeation of TAZ (Figure 2B).
- Application of this HP/TAZ formulation resulted in a higher permeation efficiency of both active ingredients compared to the individual active ingredients.

EPIDERMAL BARRIER FUNCTION

- Skin hydration and epidermal barrier maintenance were assessed through corneometry and transepidermal water loss (TEWL) over 24 hours in healthy female participants with Fitzpatrick Skin Type I-IV.
- Moisture (corneometry; Corneometer®) and skin barrier function (TEWL; Tewameter®) were evaluated following a 1-week washout with no moisturizing products. Vehicle lotion (0.05 mL) was applied to the volar forearm (other forearm served as control).
- After 24 hours, HP or TAZ concentrations were determined with Liquid Chromatography-Mass Spectrometry.

Mean Scores ± SD

- Patients preferred overall texture (hydrating, moisturizing, skin absorption), aesthetic of the vehicle lotion versus a bland 1% emulsion at the 8-hour evaluation point.

EPIDERMAL BARRIER FUNCTION

- The vehicle lotion formulation provided rapid and sustained increases in skin moisturization (Figure 3) and gradual reduction in TEWL (Figure 4) over 24 hours in healthy female participants with Fitzpatrick Skin Type I-IV.

Skin Moisturization Assessment of Vehicle Lotion and Untreated Control Over 24 Hours Using Corneometry (N=20)

- The advantage of HP/TAZ combination formulation was evident when it was shown that simple layering of TAZ 0.1% cream onto HP 0.05% cream decreased the percutaneous permeation of TAZ (Figure 2).

CONCLUSIONS
- A fixed combination HP 0.01%/TAZ 0.045% lotion formulation has been developed that utilizes an innovative polymeric emulsion technology and an optimal selection of solvents, emollients, and surfactants that is aesthetically pleasing and provides excellent delivery to the skin.
- Application of this HP/TAZ formulation resulted in a higher permeation efficiency of both active ingredients compared with application of HP or TAZ cream alone.
- These results are consistent with data from clinical studies, where HP/TAZ has been shown to provide synergistic activity, with efficacy greater than that which would be predicted from the individual active ingredients.
- Taken together, these results suggest that the unique formulation of HP/TAZ lotion may provide a more effective, predictable, and patient-preferred treatment option than use of separate formulations of HP and TAZ.

REFERENCES

AUTHOR DISCLOSURES
- Dr. Stefan Weiss has served as consultant, speaker, advisor or research honoraria from AbbVie, Ortho Dermatologics, Jansen Biotech, Dermira, Almirall, Brickell Biotech, DermTech, and Galderma; and is a stockholder for Accure.
- Dr. James Del Rosso has served as a consultant, investigator, and speaker for Ortho Dermatologics.
- Dr. Linda Stein Gold has served as consultant, speaker, advisor or research honoraria to the following pharmaceutical companies: AbbVie, Jansen Biotech, Dermira, Almirall, Brickell Biotech, DermTech, and Galderma; and is a stockholder for Accure.

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