The Efficacy and Safety of 17α-Estradiol (Ell-Cranell® alpha 0.025%) Solution on Female Pattern Hair Loss: Single Center, Open-Label, Non-Comparative, Phase IV Study

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Background: There are several commercially available agents to treat female pattern hair loss (FPHL), including minoxidil solution, anti-androgen agents and mineral supplements. However, these treatments are not always satisfactory. We report the results of a clinical trial of 17α-estradiol (Ell-Cranell® alpha 0.025%) solution to Korean female patients with FPHL. Objective: This study was designed to examine the efficacy and safety of Ell-Cranell® alpha 0.025% solution in Korean female patients with FPHL. Methods: A total of 53 women, 18 to 55 years old, applied topical Ell-Cranell® alpha 0.025% solution once daily for 8 months. Efficacy was evaluated by the change of hair counts and diameter, subjective assessment, and photographic assessment by investigators. Results: Hair counts and diameter from baseline to 4 and 8 months after treatment increased in treated patients and these changes were statistically significant (p < 0.0001). 17α-estradiol (Ell-Cranell® alpha 0.025%) solution showed significant improvement by subjective self-assessment and by investigator photographic assessment. Ell-Cranell® alpha 0.025% solution was well tolerated over 8-months period. Conclusion: This study showed that Ell-Cranell® alpha 0.025% solution is a safe and effective agent for Korean women with FPHL. (Ann Dermatol 24(3) 295~305, 2012)

Keywords- 17α-estradiol, Ell-Cranell®, Female pattern hair loss

INTRODUCTION

Androgenetic alopecia is the thinning of hairs and the reduction of hair density related to male hormones (androgens) in both males and females who are genetically predisposed to the condition. It is the most common cause of alopecia in males as well as in females1. Androgenetic alopecia has been shown to be a hereditary hypersensitivity to the male hormone, testosterone. While the causes in males and females are similar, the display patterns are different2. In males, the hair line at the temple becomes vague, hairs at the vertex are decreased and are thinly connected, resulting in increasingly obvious bald areas. On the other hand, in females, while the frontal hairline is maintained, hair density in the frontal area and the temporal region is decreased3. Androgenetic alopecia has been shown to be more common in males. According to one Korean survey, 5.6% of 4,601 females showed androgenetic alopecia that was higher than grade I according to the Ludwig classification, an ample number of female pattern hair loss patients3. The severity of hair loss in those with female pattern hair loss is milder than that of male pattern hair loss. Nevertheless, it has a major effect on women, who are generally more...
conscious about their appearance, potentially impairing their social lives and resulting in psychological pain. Currently, to treat such female pattern hair loss, anti-androgen agents, topical minoxidil agents and mineral supplements have been used. However, depending on the patient, treatment outcomes are not always satisfactory. The solution 0.025% Ell-Cranell® alpha (17α-estradiol, Galderma Korea, Co., Seoul, Korea) is a stereoisomer of the female hormone 17β-estradiol and has been used for the past 30 years in Europe, as well as in South America. The drug inhibits the conversion of testosterone to the metabolite dihydrotestosterone (DHT) by suppressing 5α-reductase activity. In addition, by inhibiting 17β-dehydrogenase, it impedes the conversion process of androstenedione to testosterone, resulting in a reduction in the synthesis of testosterone and DHT. It also accelerates the conversion of testosterone to estradiol by stimulating aromatase, decreasing the level of testosterone and leading to a reduction in DHT. In addition, the drug has been reported to stimulate the generation of hair follicular matrix cells. Clearly the use of 0.025% Ell-Cranell® alphasolution on decreased hair loss in patients with androgenetic alopecia has been shown both effective and safe. Nonetheless, the drug is not imported into Korea, and studies on Korean patients have not been conducted. Therefore, we conducted this study to assess the safety and effectiveness of 0.025% Ell-Cranell® alphasolution in Korean patients with female pattern hair loss.

MATERIALS AND METHODS

This study was an open-labeled, single-arm, single institution clinical trial. It was performed from March 2010 to December 2010 after obtaining approval from the Institutional Review Board of Wonju Christian Hospital, Wonju College of Medicine, Yonsei University.

Study subjects

The subjects were female androgenic hair loss patients between the ages of 18 and 55 years, who visited the Department of Dermatology at Wonju Christian Hospital and diagnosed as lower specific type F1 or F2 according to the basic and specific (BASP) classification. Patients with dermatological or systemic diseases which could have affected the results of the trial were excluded. Patients who had not used hair restorers for the treatment of hair loss for a minimum of six months prior to the initiation of the trial and patients who were not taking any medication that would influence the results, as determined by the investigators, were recruited. The clinical trial was explained in detail to patients who participated in the study, participation was decided by the patients themselves and written consent was obtained.

The experimental drug

In our study, 0.025% Ell-Cranell® alphasolution was used to treat hair loss. Considering that this is a drug for which the effectiveness for hair restoration has been demonstrated, is currently in use and is in phase 4 of the drug review process, as well as being approved by the Korean Food and Drug Administration, a control group for the application of a placebo was not included. The experimental drug was applied once a day at 3 ml/application using a pre-dosed applicator, and the head was massaged for approximately one minute to facilitate the absorption of the drug. The experimental drug was a topical agent, and the subjects were instructed to apply the experimental drug only to the scalp.

Efficacy evaluation

The subjects used 0.025% Ell-Cranell® alphasolution for eight months. The first efficacy evaluation was performed by examining the change in the number of hairs as assessed by phototrichogram (Folliscope®, Lead M Co., Seoul, Korea). For the second efficacy evaluation, performed four months after the initial application, the change in the number of hairs and the diameter of hair was again evaluated using phototrichogram. The growth of hair was also evaluated by the subjects themselves by questionnaire. In addition, the growth and loss of hairs were evaluated by Global photography. After using the trial drug for eight months, the change in the diameter of hairs was again evaluated.

1) Evaluation by investigators with clinical photography

Prior to photographic documentation, the hairs were combed in order to expose all areas of hair loss. Clinical photographs were taken using a phototrichogram with constant film emulsion, contrast, frame, exposure and reproduction rate, while the head of subjects were immobilized. The paired photographs were evaluated by investigators. For example, the baseline photos were compared and analyzed versus photos taken at two, four, six or eight months. The photographs were evaluated on a scale of ‘greatly improved’ to ‘worsened.’ The scale was defined as follows: ‘greatly improved’ was an improvement of more than 75%, ‘moderately improved’ was 50~75% growth, ‘slightly improved’ was 25~50%, ‘no change’ meant less than a 25% improvement and ‘worsened’ meant deteriorated cases.