



Efficacy of Finasteride in Female Pattern Hair Loss: A Meta-Analysis

Ki-Hun Kim, Soon-Hyo Kwon, Ye-Jin Lee, Woo-Young Sim, Bark-Lynn Lew

Department of Dermatology, College of Medicine, Kyung Hee University, Seoul, Korea

Dear Editor:

Female pattern hair loss (FPHL) is the most common form of alopecia in women. With increase in its incidence, attention to the treatment of FPHL has also increased. Several medications have been used for the treatment of FPHL, including topical minoxidil, oral antiandrogen, and finasteride^{1,2}. Finasteride, a 5 α -reductase inhibitor, is widely used for the treatment of androgenetic alopecia. However, the efficacy of oral finasteride in female patients with FPHL is still controversial and recommended finasteride dosage varies widely (1~5 mg/day). In this study, we aimed to evaluate the efficacy of oral finasteride treatment for female patients with FPHL by performing a meta-analysis.

We conducted comprehensive literature search of MEDLINE, Embase Cochrane library databases on articles published before May 4, 2019 using the following keywords: "finasteride", "5 α -reductase inhibitor", "female pattern hair loss", "female pattern baldness", and "female androgenetic alopecia". Search strategy used for each database is described in Supplementary Materials. Two reviewers independently evaluated the titles and abstracts of the retrieved studies, and a final decision was made through a consensus. Nine relevant studies were identified and the related PRISMA flow diagram is presented in the Supplementary Fig. 1. The data extracted from each study included the study

year, study setting, study population, age, drug dose and duration, changes in hair density, patients' self-assessment of treatment, investigators' assessment of treatment, global photographic assessments (GPA) of hair growth, and adverse effects.

Hair density and improvement rates were assessed in the meta-analysis to evaluate the efficacy of finasteride. Hair density was defined as the number of hairs per square centimeter. The differences in hair density before and after finasteride treatment were analyzed. Response was defined as "GPA \geq 1 (slightly increased)" or more than mild improvement according to the investigators' assessment. Subgroup analyses were performed according to dose of finasteride (<2.5 mg or \geq 2.5 mg). A fixed effects model was used to analyze the changes in the hair density and treatment response. The heterogeneity of the included studies was calculated using the I^2 static for inconsistency. All effects were computed using the R software, version 3.6.0 (R Foundation for Statistical Computing, Vienna, Austria).

Nine articles, involving a total of 490 patients, were included in the meta-analysis. The characteristics of the studies were summarized in Table 1. Four studies that included 250 patients reported hair density and seven studies that included 388 patients reported either GPA or investigators' assessment of treatment. The results of meta-analysis showed no significant increase in hair density after the treatments (-1.90 hair count/cm²; 95% confidence interval = -0.216 to -1.64 hair count/cm²) (Fig. 1A). The heterogeneity of the studies was high ($I^2=99%$). Because of limited number of studies and prominent high heterogeneity, subgroup analysis did not perform for hair density. The results of meta-analyzed response rate were summarized in Fig. 1B. The overall response rate with finasteride treatment was 81% (70% in <2.5 mg group and 86% in \geq 2.5 mg group). The heterogeneity of the studies was high ($I^2=92%$ [overall], 91% [<2.5 mg subgroup], and 83% [\geq 2.5 mg subgroup]). The response rate was higher

Received April 8, 2020, Revised July 28, 2020, Accepted for publication August 4, 2020

Corresponding author: Bark-Lynn Lew, Department of Dermatology, Kyung Hee University Hospital at Gangdong, 892 Dongnam-ro, Gangdong-gu, Seoul 05278, Korea. Tel: 82-2-440-7329, Fax: 82-2-440-7336, E-mail: bellotte@hanmail.net

ORCID: <https://orcid.org/0000-0003-4443-4161>

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Copyright © The Korean Dermatological Association and The Korean Society for Investigative Dermatology

Table 1. Characteristics of the nine studies included in the meta-analysis

Study (year)	Country	Study type	No. of patient	Age (yr)	Pre/postmenopausal	Finasteride dose (mg/d)	Duration (mo)	Methods of evaluating efficacies	Adverse effects
Iorizzo et al. (2006) ²	Italy	Prospective	37	19~50	Premenopausal	2.5	12	GPA (-3~3) Patients' self-assessment	None
Keene and Goren (2011)	United States	Randomized controlled	8	-	Postmenopausal	1	6	Hair density	None
Kim et al. (2012) ⁵	Republic of Korea	Prospective	14	46.3	Pre/postmenopausal	1.25	7	Hair thickness GPA (-3~3) Patients' self-assessment	-
Oliveria-Soares et al. (2013)	Portugal	Prospective	40		Postmenopausal	5	18	GPA (-3~3) Investigators' assessment	-
Price et al. (2000) ⁴	United States	Randomized controlled	62	41~60	Postmenopausal	1	12	Hair density, GPA (-3~3) Investigators' assessment Patients' self-assessment	1 patient
Whiting et al. (1999)	United States	Randomized controlled	94	41~60	Postmenopausal	1	12	Hair density	-
Won et al. (2018)	Republic of Korea	Retrospective	112	30~73	Pre/postmenopausal	2.5	-	Investigators' assessment (0~2)	None
Yeon et al. (2011) ³	Republic of Korea	Prospective	86	21~69	Pre/postmenopausal	5	12	Hair density Hair thickness GPA (-3~3)	4 patients
Yamazaki et al. (2011)	Japan	Prospective	37	29~75	Pre/postmenopausal	1	6	GPA (-3~3)	-

GPA: global photographic assessments.

in the high dose (≥ 2.5 mg) group than in the low dose (< 2.5 mg) group. Five of the nine studies reported adverse events. Yeon et al.³ reported that four patients presented with headache, menstrual irregularity, dizziness, and increased body hair. Price et al.⁴ reported one patient with folliculitis as a drug-related adverse event.

FPHL differs from male pattern hair loss in its epidemiology, clinical presentation, and management. Various oral medications, including finasteride, spironolactone, and cyproterone acetate, are used for this condition³. Several reports on the treatment of FPHL using oral finasteride have showed varying degrees of efficacies⁵. In the nine studies included in this meta-analysis, finasteride showed no effect on hair density of FPHL patients; rather hair density was decreased with finasteride treatment. However, with high heterogeneity and limited number of contained studies, reliability of result is poor. The response rate evaluated by the investigators was around 81%. The response rate increased in proportion to finasteride dose, however

limitation of single arm study, it is hard to comparing two groups' efficacy. Our findings indicated that finasteride exhibited an overall therapeutic effect in FPHL patients; however, it was not effective for promoting hair density. However, in clinical practice, evaluation of treatment response was more meaningful with rating by GPA or patients' self-assessment of treatment, not by change of hair density or thickness. In this point, high dose finasteride (≥ 2.5 mg) showed better response rate than low dose (< 2.5 mg), and high dose finasteride would be better choice for FPHL treatment. There are limitations to this meta-analysis. First, most of the included studies exhibited high heterogeneity. Second, all three of the randomized controlled studies were conducted with a finasteride dose of 1 mg. Moreover, higher number of randomized control studies with better design and administration of higher dose of finasteride in FPHL patients was need. In recent, dutasteride also used in FPHL, and several research reported efficacy of dutasteride in FPHL⁶. However, there was lack of meta-

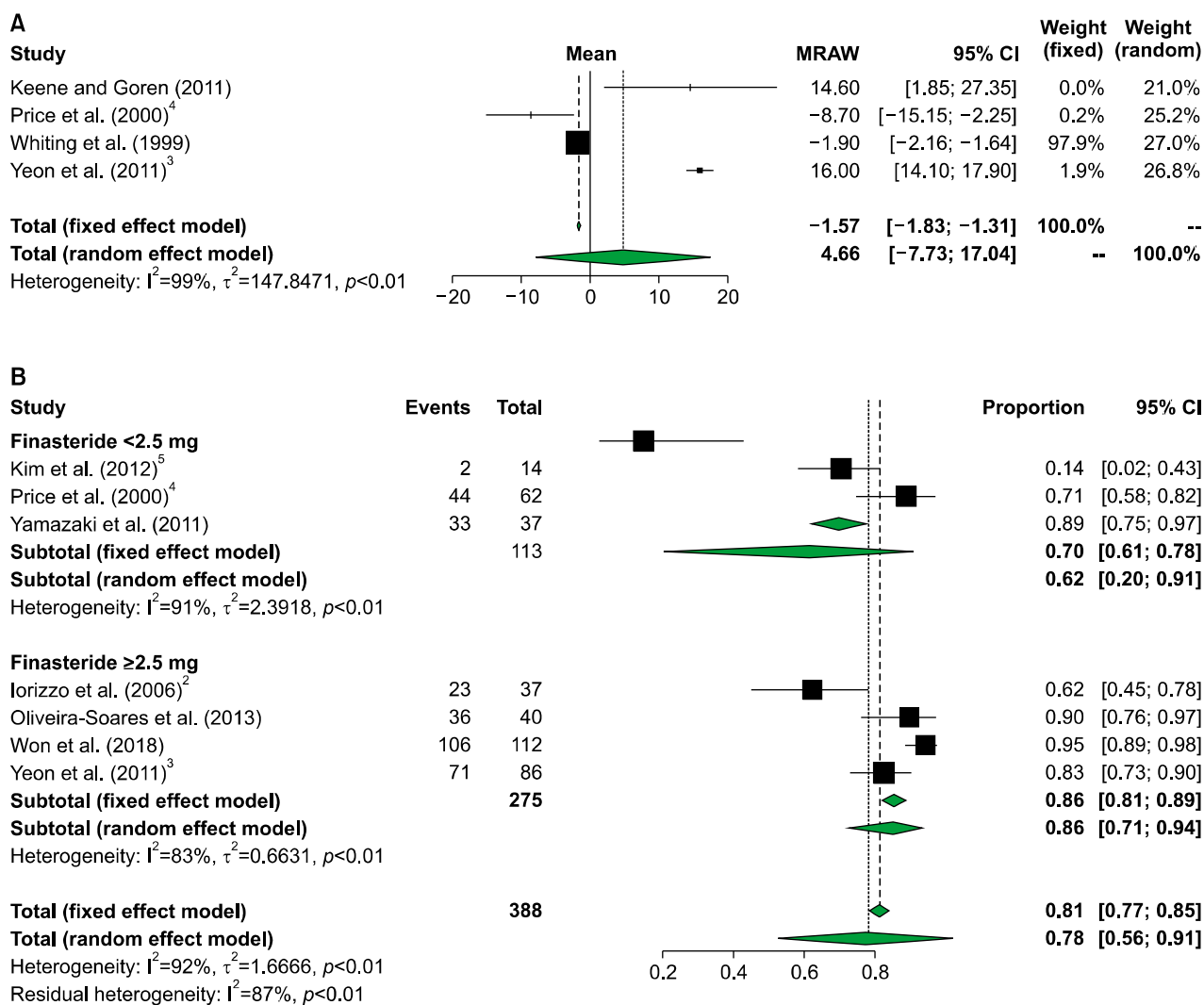


Fig. 1. Forest plot of meta-analysis for clinical outcome measures. (A) Changes in hair density before and after finasteride administration. (B) Response rates of finasteride with subgroup analysis. CI: confidence interval.

analysis of efficacy of dutasteride, as well as finasteride. Further researches with better design and comparing efficacy of finasteride and dutasteride will need. This study was exempted for a review by the institutional review board of Kyung Hee University Hospital at Gangdong in accordance with the exemption criteria (IRB no. KHNCM 2021-03-018).

SUPPLEMENTARY MATERIALS

Supplementary data can be found via <http://anndermatol.org/src/sm/ad-33-304-s001.pdf>.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

FUNDING SOURCE

None.

DATA SHARING STATEMENT

Research data are not shared.

ORCID

Ki-Hun Kim, <https://orcid.org/0000-0002-1886-3694>
 Soon-Hyo Kwon, <https://orcid.org/0000-0002-7295-5725>
 Ye-Jin Lee, <https://orcid.org/0000-0002-3032-2428>
 Woo-Young Sim, <https://orcid.org/0000-0001-5300-6869>
 Bark-Lynn Lew, <https://orcid.org/0000-0003-4443-4161>

REFERENCES

1. Olsen EA. Female pattern hair loss. *J Am Acad Dermatol* 2001;45(3 Suppl):S70-S80.
2. Iorizzo M, Vincenzi C, Voudouris S, Piraccini BM, Tosti A. Finasteride treatment of female pattern hair loss. *Arch Dermatol* 2006;142:298-302.
3. Yeon JH, Jung JY, Choi JW, Kim BJ, Youn SW, Park KC, et al. 5 mg/day finasteride treatment for normoandrogenic Asian women with female pattern hair loss. *J Eur Acad Dermatol Venereol* 2011;25:211-214.
4. Price VH, Roberts JL, Hordinsky M, Olsen EA, Savin R, Bergfeld W, et al. Lack of efficacy of finasteride in postmenopausal women with androgenetic alopecia. *J Am Acad Dermatol* 2000;43(5 Pt 1):768-776.
5. Kim WJ, Song M, Ko HC, Kim BS, Kim MB. Efficacy of finasteride 1.25 mg on female pattern hair loss; pilot study. *Ann Dermatol* 2012;24:370-372.
6. Boersma IH, Oranje AP, Grimalt R, Iorizzo M, Piraccini BM, Verdonschot EH. The effectiveness of finasteride and dutasteride used for 3 years in women with androgenetic alopecia. *Indian J Dermatol Venereol Leprol* 2014;80:521-525.