INPLASY

Efficacy of non-surgical treatments for female-pattern hair loss:a systematic review and network Meta-analysis

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 2 December 2024 and was last updated on 2 December 2024.

INTRODUCTION

Review question / Objective To systematically assess the efficacy of various non-surg ical treatment options for female pattern hair loss (FPHL) using the net work meta-analysis method, aiming to provide solid evidence-based medi cal support for the clinical treatment of FPHL.

Rationale Clinical studies on fifteen intervention measures for the t reatment of female pattern hair loss were selected based on a predeterm ined search strategy, inclusion, and exclusion criteria. The included litera ture was evaluated for quality, and important information was extracted. The effectiveness of fifteen intervention measures for treating female p attern hair loss was compared by drawing league tables and probability ranking plots using the network meta-analysismethod.

Condition being studied Female pattern hair loss (FPHL), characterized by the progressive miniaturization of hair follicles and clinically manifested as the progressive, diffuse thinning and softening of hair on the scalp's top, is a common type of hair loss in women. Clinically, FPHL is often described as "female androgenetic alopecia (FAGA)" or "female seborrheic alopecia." However, due to the less definitive relationship between increased androgens and hair loss compared to male androgenetic alopecia (AGA), "female pattern hair loss (FPHL)" has become the more commonly used term in international dermatological literature.

METHODS

Search strategy （1）中国知网
((((((主题=秃发 或者 题名=秃发 或者 v_subject=中英文扩展(秃发) 或者 title=
中英文扩展(秃发)) 或者 (主题=雄激素性秃发 或者 题名=雄激素性秃发 或者

v_subject=中英文扩展(雄激素性秃发) 或者 title=中英文扩展(雄激素性秃发))) 或 者 ((主题=假斑秃 或者 题名=假斑秃 或者 v_subject=中英文扩展(假斑秃) 或者 title=中英文扩展(假斑秃)) 或者 (主题=瘢痕性脱发 或者 题名=瘢痕性脱发 或者
v_subject=中英文扩展(瘢痕性脱发) 或者 title=中英文扩展(瘢痕性脱发)))) 或者 ((主题=脱发 或者 题名=脱发 或者 v_subject=中英文扩展(脱发) 或者 title=中英文 扩展(脱发)) 或者 (主题=秃头症, 男式 或者 题名=秃头症, 男式 或者 v_subject= 中英文扩展(秃头症, 男式) 或者 title=中英文扩展(秃头症, 男式)))) 或者 ((主 题=男性型秃发 或者 题名=男性型秃发 或者 v_subject=中英文扩展(男性型秃发)
或者 title=中英文扩展(男性型秃发)) 或者 (主题=男人型脱发 或者 题名=男人型脱 发 或者 v_subject=中英文扩展(男人型脱发) 或者 title=中英文扩展(男人型脱发)))) 或者 (主题=女性型脱发 或者 题名=女性型脱发 或者 v_subject=中英文扩 展(女性型脱发) 或者 title=中英文扩展(女性型脱发))) 并且 (((摘要=随机对照 或者 abstract_en=中英文扩展(随机对照)) 或者 (摘要=随机 或者 abstract_en=中英 文扩展(随机))) 或 者 (摘 要 = 中 英 文 扩 展 (R C T) 或 者 abstract_en=RCT)) 并且
((主题=女性 或者 题名=女性 或者 v_subject=中英文扩展(女性) 或者 title=中英文 扩展(女性)) 或者 (主题=女 或者 题名=女 或者 v_subject=中英文扩展(女) 或者 title=中英文扩展(女))) (模糊匹配)
(2)中国生物医学文献数据库
1) "秃发"[不加权:扩展]
2) "雄激素性秃发"[核心字段:智能]
3) "假斑秃"[核心字段:智能]
4) "瘢痕性脱发"[核心字段:智能]
5) "脱发"[核心字段:智能]
7) "男性型秃发"[核心字段:智能]
8) "男人型脱发"[核心字段:智能]
9) "女性型脱发"[核心字段:智能]
10) "秃头症,"[核心字段:智能] OR "男式"[核心字段:智能]
11) (#10) OR (#9) OR (#8) OR (#7) OR (#5) OR (#4) OR (#3) OR (#2) OR (#1)
12) "随机对照试验"[不加权:扩展]
13) "随机"[核心字段:智能]
14) "随机对照"[全部字段:智能]
15) (#14) OR (#13) OR (#12)
16) (#15) AND (#11)

（3）维普

(((((((((题名或关键词=秃发 OR 题名或关键词=雄激素性秃发) OR 题名或关键词 =假斑秃) OR 题名或关键词=瘢痕性脱发) OR 题名或关键词=秃头症, 男式) OR 题 名或关键词=男性型秃发) OR 题名或关键词=男人型脱发) OR 题名或关键词=女性 型脱发) AND (题名或关键词=女性 OR 题名或关键词=女)) AND ((摘要=随机对照 OR 摘要=随机) OR 摘要=RCT))

（4）万方
(秃发 OR 雄激素性秃发 OR 假斑秃 OR 瘢痕性脱发 OR 秃头症, 男式 OR 男性 型秃发 OR 男人型脱发 OR 女性型脱发) and 主题: (女性 OR 女) and 主题: (随机 对照 OR 随机 OR RCT)

（5）PubMed
(((randomized controlled trial[Publication Type] OR randomized[Title/Abstract] OR placebo[Title/Abstract])) AND ((((female[Title/Abstract]) OR (females[Title/Abstract])) OR ("Female"[Mesh])) AND ((((((((((((((((((((((((Baldness[Title/Abstract]) OR (Hair Loss[Title/Abstract])) OR (Hair Losses[Title/Abstract])) OR (Loss, Hair[Title/Abstract])) OR (Losses, Hair[Title/Abstract])) OR (Alopecia, Male Pattern[Title/Abstract])) OR (Male Pattern Alopecia[Title/Abstract])) OR (Baldness, Male Pattern[Title/Abstract])) OR (Male Pattern Baldness[Title/Abstract])) OR (Female Pattern Baldness[Title/Abstract])) OR (Baldness, Female Pattern[Title/Abstract])) OR (Androgenetic Alopecia[Title/Abstract])) OR (Pattern Baldness[Title/Abstract])) OR (Androgenic Alopecia[Title/Abstract])) OR (Baldness, Pattern[Title/Abstract])) OR (Alopecia, Androgenic[Title/Abstract])) OR (Alopecias, Androgenic[Title/Abstract])) OR (Androgenic Alopecias[Title/Abstract])) OR (Alopecia, Androgenetic[Title/Abstract])) OR (Pseudopelade[Title/Abstract])) OR (Alopecia Cicatrisata[Title/Abstract])) OR (Alopecia Cicatrisatas[Title/Abstract])) OR ("Alopecia"[Mesh])))))

（6）Embase
#5. #3AND #4
#4. 'females':ab,ti OR 'female':ab,ti
#3. #1AND #2
#2. 'randomized controlled trial':ab,ti OR 'randomized':ab,ti OR 'placebo'/exp OR 'placebo'
#1. 'baldness':ab,ti OR 'hair loss':ab,ti OR 'hair losses':ab,ti OR 'loss, hair':ab,ti OR 'losses, hair':ab,ti OR 'alopecia, male pattern':ab,ti OR 'male pattern alopecia':ab,ti OR 'baldness, male pattern':ab,ti OR 'male pattern baldness':ab,ti OR 'female pattern baldness':ab,ti OR 'baldness, female pattern':ab,ti OR 'androgenetic alopecia':ab,ti OR 'pattern baldness':ab,ti OR 'androgenic alopecia':ab,ti OR 'baldness, pattern':ab,ti OR 'alopecia, androgenic':ab,ti OR 'alopecias, androgenic':ab,ti OR 'androgenic alopecias':ab,ti OR 'alopecia,

androgenetic':ab,ti OR 'pseudopelade':ab,ti OR 'alopecia cicatrisata':ab,ti OR 'alopecia cicatrisatas'

(7) Cochrane library

#1 MeSH descriptor: [Alopecia] explode all trees

#2 (Baldness):ti,ab,kw OR (Hair Loss):ti,ab,kw OR (Hair Losses):ti,ab,kw OR (Loss, Hair):ti,ab,kw OR (Losses, Hair):ti,ab,kw OR (Alopecia, Male Pattern):ti,ab,kw OR (Male Pattern Alopecia):ti,ab,kw OR (Baldness, Male Pattern):ti,ab,kw OR (Male Pattern Baldness):ti,ab,kw OR (Female Pattern Baldness):ti,ab,kw OR (Baldness, Female Pattern):ti,ab,kw OR (Androgenetic Alopecia):ti,ab,kw OR (Pattern Baldness):ti,ab,kw OR (Androgenic Alopecia):ti,ab,kw OR (Baldness, Pattern):ti,ab,kw OR (Alopecia, Androgenic):ti,ab,kw OR (Alopecias, Androgenic):ti,ab,kw OR (Androgenic Alopecias):ti,ab,kw OR (Alopecia, Androgenetic):ti,ab,kw OR (Pseudopelade):ti,ab,kw OR (Alopecia Cicatrisata):ti,ab,kw OR (Alopecia Cicatrisatas):ti,ab,kw

#3 #1 or #2

#4 (female):ti,ab,kw OR (females):ti,ab,kw OR (Female):ti,ab,kw #5 #3 and #4.

Participant or population Adult female patients with FHPL.

Intervention Microneedle combined with minoxidil solution, microneedle combined with domain hair growth solution (YF), spironolactone combined with minoxidil solution, low dose phototherapy combined with platelet-rich plasma, low dose phototherapy combined with minoxidil solution, and topical cetirizine (C) combined with minoxidil Solution, monofilament thread therapy (PLLA) combined with minoxidil solution and external finasteride solution solution,F) combined with minoxidil solution, topical minoxidil solution, minoxidil topical foam (MTF), low-dose phototherapy, oral minoxidil tablets (OM), platelet-rich plasma, and topical cow placenta extract lotion).

Comparator Topical minoxidil solution.

Study designs to be included To systematically assess the efficacy of various non-surgical treatment options for female pattern hair loss (FPHL) using the net work meta-analysis method, aiming to provide solid evidence-based medi cal support for the clinical treatment of FPHL. Literature types: review articles, case reports or case series, repeated publications, conference papers, animal experiments, cell/tissue and other in vitro experiments and other literature that is not relevant to the research purpose

Eligibility criteria

Inclusion criteria

1) The subjects of the literature study were adult female FHPL patients;

2) The types of literature studies were limited to Randomized Controlled trials (RCT) and head-to-head trials;

3) The literature drug regimen should include all hair generating techniques or drugs other than surgical treatment, such as topical minoxidil solution, topical minoxidil foam preparation, low-dose phototherapy, oral minoxidil, platelet-rich plasma, topical bovine placental emulsion, etc.

4) Outcome indicators: The main indicators were hair density, the secondary indicators were hair diameter change, patients' satisfaction with hair growth, and adverse events;

5) The language types of documents are limited to English and Chinese;

Exclusion criteria

1) Literature types: review articles, case reports or case series, repeated publications, conference papers, animal experiments, cell/tissue and other in vitro experiments and other literature that is not relevant to the research purpose;

2) The relevant literature that the control group was placebo;

3) Unable to extract valid relevant efficacy and safety data from the literature.

Information sources Three English databases (PubMed, Embase, Cochrane Li) were systematically searched brary) and four Chinese databases (CNKI, Wanfang, VIP, and China Biomedical Database) collected clinical trial literature on the effectiveness of common non-surgical treatments for FPHL.

Main outcome(s) Average change in hair count from baseline (number of hairs /cm2) ; Average change in hair diameter from baseline (μm/ root).

Additional outcome(s) Patients' satisfaction with hair growth.

Data management According to the search strategy, a systematic search was conducted in 7 designated databases, and the relevant literature abstracts were included for import into the EndNote X9 literature management tool.

Quality assessment / Risk of bias analysis The accepted literature was evaluated for quality using the Cochrane bias risk assessment tool. The evaluation includes: (1) Selection bias: the

generation of random sequences and the hidden allocation, that is, whether the random method is correct and whether the allocation scheme is hidden; (2) Implementation bias: whether the study subjects and the intervention implementer used the blind method, and whether the failure to use the blind method would affect the evaluation of the test results; (3) Detection bias: whether the outcome evaluator adopts blind method; (4) Loss of follow-up bias: whether there is incomplete outcome data; (5) Reporting bias: selective reporting; (6) Other bias: whether the research received corporate funding related to the research purpose [17]. Two researchers independently performed an independent quality evaluation of selected literature using the tools in the Cochrane Review Manual, and pooled the evaluation results through discussion. In case of disagreement, a third researcher participates in the decision. Finally, a summary map of risk bias was generated using the Revman 5.4 software.

Strategy of data synthesis The Review Manager 5.4 software was used to evaluate the risk bias of randomized controlled clinical trials and draw Figure 2. Through R software version 4.3.2, combined with gemtc 1.0-2 package, R2jags package and ggplotrt2 package, mesh meta-analysis was performed. This includes model fitting convergence assessment (via diagnostic maps, trajectories and density maps), homogeneity and inconsistencies detection, pin-two intervention comparison results and league table creation, as well as cumulative ranking probability results and graphical representation. In addition, Stata16 software was used to map the network of interventions included in the studies, and funnel plots were developed to assess publication bias for effect measures with 10 or more included articles.

Subgroup analysis Under the index of hair density change, the change value of MN+MX hair density was better than the following 8 dry preconditioning measures compared with MX [MD=-21.13, 95%CI(-27.30,-15.38)], compared with 5% MTF [MD=-17.71, 95%CI(-30.04, -5.90)], compared with 1%C+MX [MD= -22.50, 95%CI(-39.11, -5.63)], compared with Cow-placenta [MD=-21.83, 95%CI(-32.37, -11.97)], compared with LLLT [MD-20.30=, 95%CI(-29.94, -1 1.40)], compared with MN+YF [MD=24.75, 95%CI(16.36, 33.42)], compared with PRP [MD=22.12, 95%CI(10.17, 34.80)] and SPT+MX [MD= 14.05, 95%CI(5.44, 22.85)] showed significant difference. The change of hair density of PLLA+MX was better than that of the following five interventions, which were compared with MX [MD=-18.88, 95%CI(-33.70, -4.03)] and Cow-placenta [MD-19.53=, 95%CI(-36.37, -2.63)], compared with LLLT[MD=-18.05, 95%CI(-34.50, -1.76)], compared with MN+YF [MD= -22.52, 95%CI(-39.30, -5.38)] and compared with PRP [MD= 19.82, 95%CI(1.93, 37.91)] were statistically significant. The hair density change value of LLLT+MX was better than that of the following four interventions, which were compared with Cow-placenta [MD=-13.51, 95%CI(-24.53, -2.47)] and LLLT [MD=-11.97, respectively. 95%CI(-19.10, -5.00)], compared with MN+ YF [MD= 16.45, 95%CI(5.36, 27.26)], compared with PRP [MD= 13.78, 95%CI(3.13, 24.70)] were statistically significant. The differences between the other interventions were not statistically significant. According to pairwise comparison of interventions, MN+MX, PLLA +MX and LLLT+MX were superior to Cow-placenta, LLLT, MN+YF and PRP in terms of hair density. MN+MX and PLLA+MX were superior to MX alone in terms of hair density. MN+MX is better than 5%MTF, 1% C+MX and SPT+MX in this index.Pairwise comparison of 10 interventions under the hair diameter change index, PLLA +MX hair diameter change was better than the following four interventions, compared with MX [MD= -43.63, 95%CI(-71.80, -15.35)], compared with 0.25mgOM [MD=-42.64, 95% CI (38-82., 2.53)], and MN + MX [MD = 42.62, 95% CI (82.25, 2.42)], and MN + YF [MD = 45.64, 95% CI (85.08, 5.34)] results are statistically significant. The differences between the other interventions were not statistically significant.

The satisfaction of MN+MX patients was better than the following four interventions, which were compared with MX [RR=-36.21, 95%CI(-91.42, -3.80)] and LLLT [RR=-36.53, respectively. 95%CI(-91.91, -3.76)], compared with LLL T+MX [RR=-33.68, 95%CI(-89.03, -0.88)], compared with MN+YF [RR= 33.72, 95%CI(0.99, 88.85)] and PLLA+MX [RR=33.58, 95%CI(0.77, 8 8.95)] were statistically significant.

Sensitivity analysis For the articles on hair density, all the studies were within the confidence interval, and the scattered points of each study were located in the middle and upper part of the study and were basically symmetrical, so the possibility of publication bias was small. The scattered points of one study were distributed at the bottom of the funnel, suggesting the possibility of small sample effect.

The article on hair diameter shows that MX and LLLT (i2.pair =23.79427% < 50%, i2.cons = 31.02683 < 50%), LLLT and LLLT+MX (i2.pair = 0 < 50%, i2.cons = 0 < 50%) there is heterogeneity in direct comparison and mixing ratio. Global direct comparison Global i2.pair = 0 < 50%, global

i2.cons = 0 < 50%. It indicates that the overall consistency is good and no sensitivity analysis is required.
Articles on patient satisfaction Global direct comparison Global i2.pair = 49% < 50%, global i2.cons =0 < 50%. It indicates that the overall consistency is good and no sensitivity analysis is required.

Language restriction English and Chinese.

Country(ies) involved China - Fourth Hospital of Hebei Medical University.

Keywords Female Pattern Hair Loss, Non-surgical, Efficacy, Combined, Network Meta-Analysis.

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