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INPLASY

Clinical efficacy of cysteamine application for melasma: A meta-analysis

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ADMINISTRATIVE INFORMATION

Support - No external financial support.

Review Stage at time of this submission - The review has not yet started.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 03 August 2024 and was last updated on 28 October 2024.

INTRODUCTION

Review question / Objective Overall, how effective does cysteamine only regimen treat melasma compared to other treatments dealing with melasma? Better? Or worse? Or comparable effectiveness?

Rationale Cysteamine inhibits tyrosinase activity and decreases melanocyte hyperactivity leading to decreased melanin production. The potent depigmenting effect has been evidenced in melasma patients who have shown resistance to Kligman's formula. Recent randomized double-blind placebo-controlled studies have also demonstrated the therapeutic efficacy. Nevertheless, clinical investigations comparing its efficacy to mKF have yielded inconsistent resultsThis study aims to perform a meta-analysis to investigate the effectiveness of cysteamine in the treatment of melasma and to identify factors that could influence its therapeutic results.

Condition being studied The established gold standard treatment for melasma is Kligman's formulation comprises hydroquinone 5%, tretinoin 0.1%, and dexamethasone 0.1%. The side effects included erythema, desquamation, and steroid-induced telangiectasia. Combinations having higher potency corticosteroids like mometasone, are marketed as 'modified Kligman formulation'(mKF). However, risk of exogenous ochronosis still precludes its long-term use. Cysteamine was initially identified in the mid-20th century as a component of the coenzyme A metabolic pathway, an aminothiol derived from the natural degradation of L-cysteine.

METHODS

Search strategy An extensive electronic search was conducted in online databases, including PubMed, Embase, Web of Science, and CENTRAL. In terms of specific search strategy, two authors (BQW and YJW) conducted independent electronic searches in the databases mentioned above using

the following combination: (melanosis or melasma or chloasma) AND (cysteamine) AND (MASI OR mMASI).

Participant or population P: participants with facial melasma.

Intervention I: topical cysteamine component treatment.

Comparator C: no comparison restrictions.

Study designs to be included RCTs and quasi-randomized design

Eligibility criteria 1) randomized controlled trials (RCTs) or quasi-randomized controlled trials, 2) studies enrolling human participants, 3) studies evaluating melasma using MASI or mMASI, 4) trials encompassing topical cysteamine component intervention, and 5) studies evaluating the depigmentation effect at least 4 months or 16 weeks after treatments.

Information sources 1) electronic search was conducted in online databases, 2) The reference lists of identified review articles were also checked, and 3) additional manual searches.

Main outcome(s) mMASI (modified Melasma Area and Severity Index) or MASI (Melasma Area and Severity Index).

Additional outcome(s) NA.

Data management Two independent authors (BQW and YHH) extracted data from the evaluated studies. Extracted data included first author, publication year, country, study design, patient age, Fitzpatrick skin type, baseline MASI, melasma duration, follow-up durations, melasma clinical assessment tools, and cysteamine regimens. Data extraction, conversion, and merging of data from different study arms rigorously followed the guidelines specified in the Cochrane Handbook for Systematic Reviews of Interventions.

Quality assessment / Risk of bias analysis To evaluate the methodological quality of the included studies, the authors adopted the Cochrane risk of bias tool for randomized studies (version 2, RoB 2, London, United Kingdom).

Strategy of data synthesis This meta-analysis was conducted with a random-effects model using the Comprehensive Meta-Analysis software (version 4, Biostat, Englewood, NJ, United States). A two-tailed p-value less than 0.05 was defined as statistically significant.
Mean difference (MD) and 95% confidence intervals (CIs) were utilized to estimate the efficacy of cysteamine usage. The calculation involved determining the post-intervention difference in MASI scores between the cysteamine-treated group and the control group. A negative effect size value indicates a beneficial outcome of using cysteamine. Heterogeneity was quantified using I^2 and Cochran's Q tests. I^2 values of 25%, 50%, and 75% were classified as low, moderate, and high heterogeneity, respectively. Meta-regression analyses were performed to explore additional covariates that interacted with the summary effect size, such as baseline MASI, disease duration of melasma, patient age, and sample size of the included studies.

Subgroup analysis Subgroup analyses were performed to assess the impact of controlled type and different cysteamine application protocols on heterogeneity within the study. The distinction between subgroups was measured utilizing Cochran's Q test. A p-value lower than 0.05 in Cochran's Q test indicates statistically significant differences among the related subgroups.

Sensitivity analysis To confirm the robustness of the results of this meta-analysis, one-study removal methods were also used to determine whether there was a statistically significant change in the summary effect size after removing a particular trial from the analysis.

Language restriction This study imposed no language restrictions.

Country(ies) involved Taiwan.

Other relevant information Guidelines from the Cochrane Handbook for Systematic Reviews of Interventions were used to evaluate for potential publication bias. Funnel plots were generated and visually inspected for symmetry. Duval and Tweedie's trim and fill method was adopted to estimate the number of missing studies. Egger's regression tests were conducted when 10 or more datasets were available.

Keywords cysteamine, melasma, hydroquinone, tranexamic acid mesotherapy.

Dissemination plans Publish in international journals.

Contributions of each author

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