Botulinum Toxin A for the Treatment of Androgenetic Alopecia: A Recent Review

Laith Basch, BS[1], Caden Carver, DO[2], Dr. Daniel Tinker MD[3], FAAD, John Ashurst DO[4], DEd, MSc, FACEP, FACOEP

Arizona College of Osteopathic Medicine, Midwestern University, Abrazo Health Network, Goodyear, AZ, USA, Deluxe Dermatology

INTRODUCTION

Androgenic alopecia (AGA) is a common condition characterized by progressive hair loss in various scalp patterns, significantly impacting self-esteem and mental health. Conventional treatments, including finasteride (a 5-alpha reductase inhibitor) and minoxidil (a topical vasodilator), have demonstrated inconsistent effectiveness and are often accompanied by undesirable side effects. Botulinum toxin type A (BTA), a neurotoxin derived from Clostridium botulinum, is widely recognized for its cosmetic use in reducing facial wrinkles. Emerging evidence suggests that BTA may benefit AGA patients by improving scalp blood flow and reducing tension, potentially enhancing hair growth.

OBJECTIVES

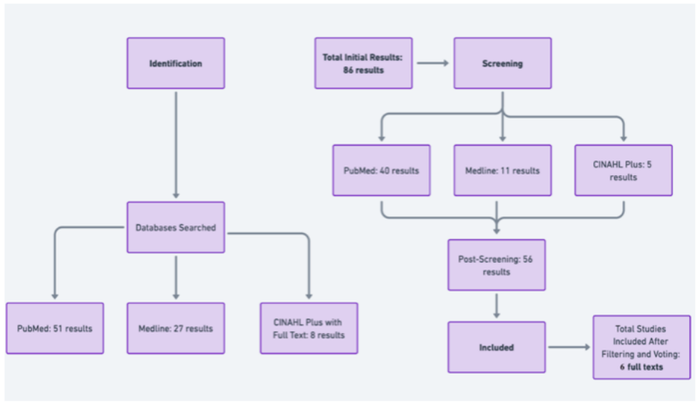
How effective is Botulinum Toxin A (BTA) in improving hair growth, density, and scalp conditions in androgenetic alopecia (AGA) patients, both as a standalone treatment and in combination with conventional therapies?

1. Investigate the effects of Botulinum Toxin A (BTA) on hair growth, density, and scalp conditions in patients with androgenetic alopecia (AGA).

2. Compare the efficacy of BTA as a standalone treatment versus its combined use with conventional therapies such as finasteride and minoxidil.

3. Critically review and synthesize current research on the effectiveness of BTA in managing androgenetic alopecia (AGA).

METHODS



A systematic search was conducted in PubMed, Medline, and CINAHL Plus using the phrase "(Androgenetic alopecia) AND (Botulinum toxin) AND (Treatment)". Studies published between 2013 and 2024 were included, focusing on randomized controlled trials, cohort studies, and pilot studies assessing BTA alone or combined with finasteride and minoxidil. Data on hair density, hair loss area, and adverse effects were extracted and analyzed.

RESULTS

From an initial pool of 86 articles, 56 were deemed relevant, and 6 studies were selected for detailed analysis based on alignment with the review's objectives. The 6 selected studies consistently demonstrated that BTA improved hair growth and reduced hair loss in patients with AGA.

Tian et al.

In a prospective cohort of 37 male AGA patients, **BTA injections combined with finasteride and minoxidil increased hair density by 75.7% compared to the control group**, while also reducing scalp oiliness, pruritus, and dandruff.

Zhou et al.

In a randomized trial, **BTA alone increased hair density to 218.26 roots/cm² with 73.3% effectiveness**, while **combining BTA with finasteride (FNS) further improved density to 234.01 roots/cm² with 84.8% effectiveness ($p < 0.05$)**.

Singh et al.

In a study of 10 male AGA patients, **80% reported good to excellent hair regrowth at 24 weeks, with no side effects observed during follow-up.**

Seoudy and Metwally

In 32 AGA patients **Increasing BTA concentration to 33.3 U/mL every three months led to greater hair density improvements compared to 25 U/mL.**

Shon et al.

Intradermal BTX injections were administered every 4 weeks for 24 weeks. **Results showed a significant increase in hair density from 129.61 ± 28.05 to 136.22 ± 33.05 hairs/cm² at 24 weeks**

Zhang et al.

In a 6-month trial of 24 AGA patients, **BTX led to >10% hair regrowth in 9 patients at 3 months and 11 at 6 months,** with reduced grease secretion in 19 patients. No adverse effects were reported, suggesting BTX improves scalp blood flow and promotes hair growth.

Across studies, the use of BTA was associated with minimal adverse effects, such as transient pain at the injection site. These findings highlight the efficacy and safety of BTA as a promising therapy for AGA, both independently and in combination with established treatments.

DISCUSSION

This review highlights botulinum toxin A (BTA) as a promising treatment for androgenetic alopecia (AGA). BTA has shown consistent effectiveness in improving hair density and reducing hair loss, both alone and when combined with traditional therapies like minoxidil and finasteride.

Compared to conventional treatments, BTA presents fewer side effects—mainly mild, localized discomfort—while potentially offering similar or enhanced efficacy. Its mechanisms, such as improving scalp blood flow and reducing tension, target different pathways than existing medications.

Combining BTA with traditional therapies has demonstrated significant improvements in hair growth outcomes. However, larger, long-term studies are needed to determine optimal dosing, treatment frequency, and effects across diverse populations. These findings suggest BTA could be a valuable addition to AGA treatment strategies.

REFERENCES

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