

COVID-19-induced Scalp Alopecia Treated Effectively with Stem Cell Serum

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Summary: Up to 36.7% of symptomatic COVID-19 patients will have telogen effluvium (TE), which refers to diffuse scalp alopecia. With the continuing global pandemic, a review of literature reports unpredictable and incomplete recovery with conventional treatment like minoxidil. The pathogenesis of COVID-19-induced TE may be more severe than that of conventional TE as the hair follicles are proposed to be directly damaged by cytokines and thromboembolism. There is no current standardized treatment for COVID-19-induced TE. We present a patient with severe chronic TE, with no spontaneous recovery after 6 months of hair loss and minimal response to minoxidil. We commenced monthly applications of stem cell serum (Calecim). We present the results of five treatments spaced monthly, after which he experienced effective regrowth of scalp hair. We propose stem cell serum for patients who have failed conventional treatment or as an adjunct to conventional therapy in COVID-19-induced TE. (*Plast Reconstr Surg Glob Open* 2022;10:e4423; doi: [10.1097/GOX.0000000000004423](https://doi.org/10.1097/GOX.0000000000004423); Published online 20 June 2022.)

The ongoing COVID-19 pandemic poses a global health crisis that has led to long-term health consequences in up to 67% of the recovered patients. Although long COVID-19 symptoms include chronic fatigue, chest pain, and memory loss, another increasingly recognized stigmata is diffuse scalp alopecia or telogen effluvium (TE). This was reported to affect up to 36.7% of hospitalized patients.¹⁻³ We anticipate an increased demand for COVID-19-induced TE treatment and present a case of COVID-19-induced TE effectively treated with conventional daily minoxidil, daily LED light therapy, and monthly application of Calecim stem cell serum.

CASE REPORT

Our patient is a 30-year-old, previously unvaccinated man with no medical or psychiatric history. Based in a

neighboring third world country in early 2021, he contracted COVID-19 but was unable to receive any medical care. Neuropsychiatric complications with attempted suicide developed 3 weeks after the infection, and he was evacuated back to Singapore where he commenced psychiatric care. Discharged at 2 weeks on antidepressant therapy, readmission was needed 2 months later for refractory depression that required electroconvulsive therapy. Subsequently, he was referred 3 months after COVID-19 infection for scar management of the self-inflicted neck and arm lacerations. Five months after COVID-19, he requested treatment for diffuse scalp alopecia. Hair loss had commenced 6 weeks after infection. He had hair fragility, decreased hair density, and a positive hair pull test (Fig. 1). Topical minoxidil and LED light treatment (Hairmax) were commenced. There was minimal improvement and with no spontaneous regrowth after 3 months of conservative treatment. As the acute hair loss was by more than 6 months in duration and deemed chronic, he was commenced on monthly application of stem cell serum (Calecim). The scalp was topically numbed for 30 minutes with benzocaine, lignocaine, and tetracaine mix. The scalp was divided into the 5 regions: right sideburn and temple, frontal hairline, left sideburn and temple, prefrontal hairline, and crown. Each region was progressively treated with rubbing with an alcohol swab, then 1 ml of stem cell serum was applied and massaged in till dry. The patient was advised to wait until evening to wash his hair. He continued on twice daily minoxidil application and daily Hairmax LED light treatment.

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Fig. 1. Superior view of the patient's scalp pretreatment with scalp visibility, hair fragility, and poor hair density.

RESULTS

Five treatments spaced a month apart were administered. The patient had progressive improvement in hair density with regrowth of frontal hairline and villus hair in the prefrontal region (Figs. 2, 3). Hair fragility was reversed with no breakage of the hair on combing.

DISCUSSION

Acute TE usually commences 2–3 months after major physiologic or psychological stress,^{4–6} earlier than classic TE, and usually lasts less than 6 months.⁶ TE is chronic when there is no spontaneous recovery after 6 months. The risk factors for COVID-19-induced TE are high fever, psychological stress, need for hospitalization, and need for polypharmacy during the hospital stay. COVID-19-induced TE is proposed to be more severe than classic TE as the hair follicles suffer direct damage from the pro-inflammatory cytokines, viral-specific attack,⁶ and micro-thrombi occlusion of hair follicle vasculature.⁷ Damage to the hair follicles causes an abrupt shift from the growing anagen phase to the resting telogen phase and results in the loss of more than 100 hairs a day. Although patients with symptomatic COVID-19 infection should be warned of possible acute TE, subclinical COVID-19 infection is also associated with TE in 10% of patients.²

Treatment advice for COVID-19-induced TE has been inconsistent. Although some authors advocate no treatment as conventional acute TE tends to recover spontaneously in 6 months, COVID-19 TE is associated with partial

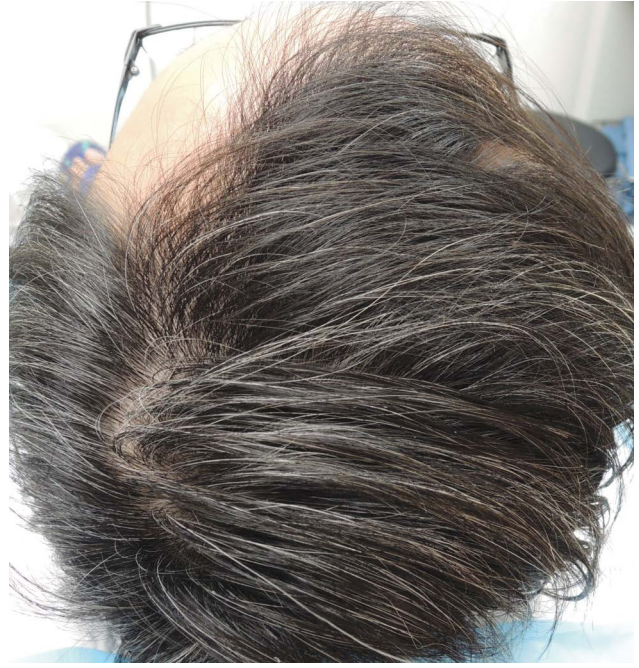


Fig. 2. Superior view of the patient's scalp 3 months posttreatment with less scalp visibility and commencement of regrowth of frontal hairline. The hair could be combed without fragility and breakage.

response even with 6 months of conventional therapy using minoxidil.^{2,6} As TE is psychologically distressing, we propose early intervention with conventional treatments of daily minoxidil and LED light therapy. If spontaneous improvement is not apparent after 6 months, the topical



Fig. 3. Results 6 months after commencement of five monthly stem cell serum applications with minimal scalp visibility and restoration of hair density.

application of stem cell serum may serve to reverse the chronic TE.

Calecim is a brand of stem cell serum marketed as a cosmeceutical. It is stem cell-conditioned media derived from mesenchymal stem cells of the umbilical cord lining. Recently, stem cell-based therapies and, in particular, stem cell-derived conditioned media are increasingly popular for treatment of pattern hair loss.⁸ Stem cell-derived conditioned media is rich in bioactive molecules such as cytokines and growth factors, which are proposed to aid in suppressing proinflammatory cytokines and reversing disrupted hair follicle activity in conventional alopecia.⁹ Cell-free conditioned media is proposed to be more desirable than stem cell-based transplantation as it avoids donor–recipient matching, is easier to prepare, is cheaper, and has less risk of tumor development.¹⁰ The potential to reverse COVID-19-related cytokine storm damage on the hair follicles is the basis of our novel use of the serum in COVID-19-induced TE. Hair loss was arrested with regrowth of hair density, and caliber was seen in our patient. As thromboembolism is an etiopathogenic process in COVID-19 TE, the wounding of the scalp with alcohol preserum application may serve to increase serum penetration and increase neovascularization. Pain, bleeding, and open wounds were not required.

In conclusion, the medical community should expect a surge in COVID-19 survivors requesting treatment of acute alopecia, as acute TE is seen in up to 36.7% of cases. We should be ready to provide treatment options for our patients. We propose early intervention with topical treatment with minoxidil and LED light therapy, but if TE is severe and persistent to consider the addition of stem cell serum.

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The off-label product used was a cosmeceutical and the procedure using the product was done with the patient's full consent.

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