

SHORT PAPER

Telogen effluvium associated with COVID-19 infection

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Abstract

Telogen effluvium (TE) is characterized by diffuse hair shedding 2-3 months after a stressor, and COVID-19 infection is potentially one such stressor. Those who were infected with the virus were under immense psychosocial and physiologic stress. We retrospectively reviewed electronic medical records of 552 patients who were evaluated by a Henry Ford Health System dermatologist between February 2020 and September 2020 and had a diagnosis of COVID-19 infection. Ten patients were identified with TE attributed to COVID-19 infection and described their presentations as a case series. For the ten patients selected, the mean age was 48.5 years old and 90% were female. Six of the patients were Black, one Middle Eastern, and three White. On average, the hair shedding began 50 days after the first symptom of COVID-19 infection. About 80% of these patients were treated with antibiotics, systemic corticosteroids, and/or hydroxychloroquine for their COVID-19 infection and 70% were hospitalized. The presentations of these patients suggest that COVID-19 infection may be a significant trigger of TE. TE caused by hydroxychloroquine, azithromycin or other medications cannot be ruled out, and the global pandemic itself is a source of psychosocial stress. Further studies will be needed to understand the long-term prevalence and prognosis of TE associated with COVID-19 infection.

KEYWORDS

COVID-19, hair shedding, telogen effluvium

1 | INTRODUCTION

Telogen effluvium (TE) is characterized by diffuse hair shedding 2-3 months after a stressor.¹ The precipitating event causes premature termination of the anagen phase and subsequent transition to the catagen and telogen phases, resulting in hair shedding. TE is usually self-limited; acute TE typically resolves within 6 months of onset and is not a scarring alopecia.^{2,3} Stressors that can cause TE include pregnancy, psychological trauma, illness, hospitalization, surgery, malnutrition, and medications. The COVID-19 pandemic is associated with these stressors; those who were infected with the virus were under immense psychosocial and physiologic stress.⁴ The body responds to SARS-CoV-2 infection by creating a proinflammatory state, which leads to tissue damage and other

sequelae. Proinflammatory cytokines are released and anti-coagulation mechanisms are impaired, which may provoke TE via the systemic inflammatory response and/or microthrombi in the hair follicles.⁵

Henry Ford Hospital is an urban academic center located in Detroit, Michigan, with satellite hospitals and clinics throughout Southeastern and South-central Michigan. During the Spring of 2020 at the onset of the pandemic, Detroit had a high incidence of COVID-19 infections. At Henry Ford Hospital, 15 345 patients were tested via polymerase chain reaction for SARS-CoV-2 infection between February 1 and April 18, 2020, and 38.3% of those patients were positive.⁶ Here, we present a case series that suggests that COVID-19 infection and associated stressors can induce TE.

TABLE 1 Summary of 10 patients diagnosed with TE after COVID-19 infection

Case	Age	Gender	Race	Onset related to COVID-19 infection	Hospitalized for COVID-19	Treatment of COVID-19 infection	Physical exam findings	Treatment of telogen effluvium
1	53	Female	Middle Eastern	30 days	Yes	Azithromycin, ceftriaxone	Positive telogen hair pull test	Reassurance, triamcinolone lotion prn for itching
2	50	Female	White	90 days	No	Azithromycin	N/A-virtual visit	Reassurance
3	54	Female	White	21 days	Yes	Hydroxychloroquine, azithromycin	Positive telogen hair pull test	Minoxidil 5% solution, biotin supplementation
4	28	Female	Black	30 days	Yes	Hydroxychloroquine, antibiotics	Diffuse hair thinning	Reassurance
5	56	Female	Black	60 days	Yes	Hydroxychloroquine, methylprednisolone	Diffuse hair thinning, positive telogen hair pull test	Minoxidil 5% solution
6	47	Female	Black	60 days	No	Supportive	Diffuse hair thinning, positive telogen hair pull test	Minoxidil 5% foam, iron supplementation
7	50	Female	Black	30 days	Yes	Antibiotics	N/A-virtual visit	Reassurance
8	28	Female	Black	30 days	No	Supportive	Post-inflammatory hyperpigmentation	Dandruff shampoo, dobetasol solution, fluocinolone oil
9	57	Female	White	60 days	Yes	Hydroxychloroquine, methylprednisolone, prednisone, antibiotics	Thinning of frontal scalp and vertex, negative telogen hair pull test	Minoxidil 5% foam
10	62	Male	Black	90 days	Yes	Hydroxychloroquine, azithromycin, methylprednisolone	Diffuse hair thinning, miniaturization at crown, negative telogen hair pull test	Minoxidil 5% solution, vitamin D supplementation

2 | METHODS

Study approval was obtained from the Henry Ford Health System's institutional review board (IRB approval number: 13960) and informed consent was waived. We retrospectively reviewed electronic medical records of 552 patients who were seen by a Henry Ford Health System dermatologist between February 2020 and September 2020 and had a diagnosis of laboratory-confirmed or suspected COVID-19 infection. We reviewed the patients' demographics, dermatologic manifestation, onset in relation to the first COVID-19 symptom, and treatment for the dermatologic manifestations. Prior dermatologic history, COVID-19 test results, and treatment modalities of COVID-19 infection were also reviewed. Of these patients, 354 of them were female (64.1%) and 198 were male (35.9%). The majority of patients were White (262 patients, 47.5%) or Black (218 patients, 39.5%). Other races represented include Latino (15 patients, 2.7%), Middle Eastern (8 patients, 1.4%), East Asian (7 patients, 1.3%), and South Asian (3 patients, 0.5%). The race of the remaining 39 patients was unknown (7.1%). Many of the patients' dermatologic conditions were unrelated to COVID-19 infection. The most common finding associated with COVID-19 infection was TE. Other dermatologic manifestations of the virus included livedo racemosa, pernio, purpura, onychomadesis, and morbilliform eruption. We identified 10 patients diagnosed with TE attributed to COVID-19 infection and associated stressors and describe their presentations here. One additional patient was excluded as the diagnosis of TE was made by her primary care physician but was not observed by the dermatology team.

3 | RESULTS

We identified 10 patients that were diagnosed with TE ranging from 3 weeks to 3 months after diagnosis of COVID-19 infection (Table 1). The mean age of the patients in this study was 48.5 years old. The vast majority (90%) were female. Six of the patients were Black, one Middle Eastern, and three White. On average, the hair shedding began 50 days after the first symptom of COVID-19 infection. About 80% of these patients were treated with antibiotics, systemic corticosteroids, and/or hydroxychloroquine for their COVID-19 infection and 70% were hospitalized.

4 | DISCUSSION

The presentations of these patients suggest that COVID-19 infection may be a significant trigger of TE, possibly due to psychosocial or physiological stress. Most of these patients had a severe enough infection that they required hospitalization and treatment with antibiotics, systemic corticosteroids, and/or hydroxychloroquine. In previous studies, it has been reported that those with more severe COVID-19 infections had higher levels of proinflammatory cytokines, which may correlate to a higher risk of TE given the proinflammatory state.^{4,5} In

addition, the coagulation cascade becomes activated in response to COVID-19 infection, and there is decreased concentration of anticoagulant proteins due to decreased production and increased consumption.⁵ These factors can lead to microthrombi formation, which may occlude hair follicle blood supply. Microthrombi and systemic inflammation represent two possible mechanisms to explain how COVID-19 infection could provoke TE.

The mainstay of treatment for TE is correcting the underlying cause and removing the inciting stressor.³ This may involve treating the underlying illness, discontinuing the causative medication, or correcting nutritional deficiencies. All of these patients had since recovered from COVID-19 infection, so the presumed primary stressor had resolved; however, it is known that TE can last months or longer after the initial stress. Although topical minoxidil was prescribed in 50% of our patients, there is not strong evidence to suggest that it is efficacious for TE.⁷ Educating the patient on the self-limiting natural course of the condition is a crucial component of management. The hair will eventually stop shedding and begin to grow back, but it may take up to 18 months for hair thickness to return to baseline.¹

There are limitations to our study. This was a single health system, retrospective study with a relatively small sample size. However, to our knowledge, the only other studies investigating TE triggered by COVID-19 infection are case reports and one 10-patient case series.^{8,9} The case series published by Mieczkowska et al included four White patients, one Black patient, and four patients of unknown race.⁸ Compared with other studies, we had significantly more skin of color patients, as our case series included six Black patients and one Middle Eastern patient. It is important to note that although 39.5% of the patients in our overall sample were Black, 60% of the patients we identified with TE after COVID-19 infection were Black. Other studies have shown that Black patients are disproportionately affected by COVID-19 and its complications, and this discrepancy may indicate that Black patients are at increased risk for TE after COVID-19 infection.¹⁰

In addition, TE caused by hydroxychloroquine, azithromycin, or other medications cannot be ruled out. The global pandemic itself is another potential source of psychosocial stress, and there may be an overall increase in the incidence of TE as a result.¹¹ Nonetheless, these cases suggest that COVID-19 infection and likely the psychological and physiological stress surrounding the illness is capable of inducing TE. As the pandemic continues, further studies will be needed to understand the long-term prevalence and prognosis of TE associated with COVID-19 infection.

CONFLICT OF INTEREST

Henry Lim is a board member of the International League of Dermatological Societies that has provided partial support for the AAD-ILDS COVID-19 Dermatology registry.

AUTHOR CONTRIBUTIONS

Hailey Olds, Jesse Liu, and Kevin Luk: Data collection. Hailey Olds: Drafted the manuscript and all authors assisted in editing.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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