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### Title

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### Permalink

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### Journal

Dermatology Online Journal, 27(10)

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### Publication Date

2021

### DOI

10.5070/D3271055619

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# Telogen effluvium caused by COVID-19 in Elmhurst, New York: report of a cohort and review

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## Abstract

The prevalence of telogen effluvium (TE) has increased during COVID-19. In this study we describe the clinical characteristics of patients with COVID-19-related TE and review the current literature on COVID-19-associated TE. We conducted a retrospective chart review of 66 patients, all of which had COVID-19 infection (confirmed by PCR or antibodies) and had either non-scarring hair loss or TE in Elmhurst, Queens. Our data suggest that this form of TE is similar to other forms of TE, after which many patients experience regrowth within several months.

*Keywords: alopecia, COVID-19, hair loss, hair shedding, telogen effluvium*

## Introduction

Telogen effluvium (TE) is profound diffuse scalp hair loss characterized by premature transition from anagen to telogen phases, typically resulting from a physiological stressor. Stressors, such as surgery or pregnancy, are self-limited, with hair returning normal within 6 months. Dermatologists have seen a dramatic increase in TE cases during COVID-19 [1-3]. We conducted a retrospective chart review of patients in Elmhurst, Queens with COVID-19-associated TE in which we describe the clinical characteristics of these patients. We also review the literature on COVID-19-associated TE.

Elmhurst has been referred to as the “epicenter of the epicenter” of the COVID-19 outbreak in New York City. This neighborhood and neighboring Jackson Heights were affected by COVID-19 early in the pandemic—March and April of 2020—disproportionately to other parts of the city, with one in nine residents being diagnosed with COVID-19 [4]. The study site is a private practice dermatology office located one block from the Elmhurst Hospital Center, where 13 people died within a 24-hour period in mid-March [5].

## Methods

Our study was approved by the Mount Sinai Institutional Review Board. We retrospectively reviewed the charts of patients seen for international classification of diseases (ICD) 10 codes L65.9 (non-scarring hair loss) and L65.0 (TE) in an outpatient dermatology office in Elmhurst, New York between April 1, 2020 and December 31, 2020.

Patients who were determined to have recent onset or significantly worsening TE with a self-reported history of COVID-19 or with positive antibodies were included in this study. Clinical data collected included patients' age, gender, ethnicity (Latinx/non-Latinx), hospitalization, weight loss, medication administration for COVID-19 infection, and prior medical conditions and medications. Laboratory values collected included TSH, T3, T4, ANA, zinc, ferritin, and 25-hydroxy vitamin D.

## Results

We identified 66 patients that were diagnosed with TE and laboratory confirmed COVID-19 from April to December 2020. The mean age of patients in our study was 45. The majority of patients were female (94%) and Latinx (88%), ([Table 1](#)).

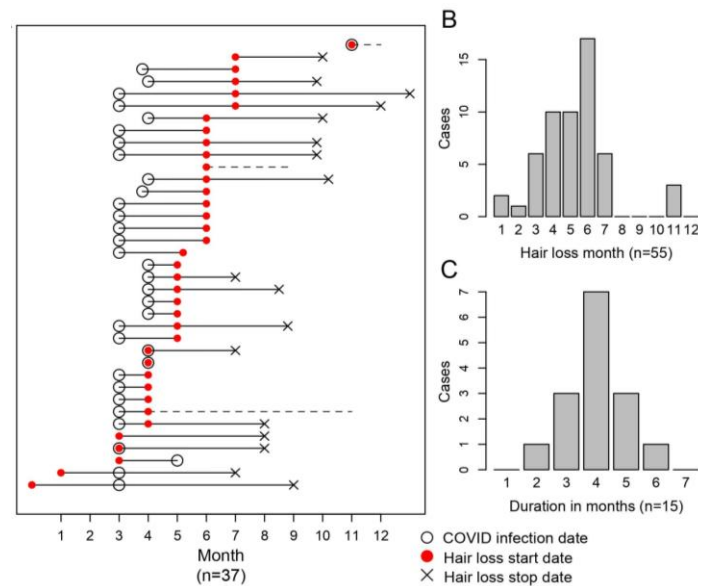
Seventy-eight percent of these patients were symptomatic with COVID-19. Only three of 57 patients (5%) for whom data were available were hospitalized due to their illness. Most patients (88%, 46/52) did not take prescription or over-the-counter medications to treat COVID-19. About a third of patients with available data experienced weight loss (31%, 15/48), ([Table 1](#)).

Among patients with known values, 78% (35/45) had low levels of 25-hydroxy vitamin D according to our laboratory's reference value of below 32ng/mL, with a mean value of 22.625ng/mL, SD 5.35; 28% (13/45) had low 25-hydroxy vitamin D using the Center of Disease Control's (CDC) reference value of below 20ng/mL [6]. Other laboratory abnormalities for patients with known values were less common: 26% (10/38) of patients had ANA levels of 1:160 or higher, 13% (6/45) of patients had low ferritin, 8% (3/40) had an abnormal TSH, and 6% (2/36) had low zinc levels ([Table 2](#)).

Half of patients (50%, 33/66) had a potentially confounding pre-existing medical condition, including but not limited to alopecia areata, thyroid disorders, menopause, anxiety, and depression ([Table 3](#)). Forty-five percent (30/66) were taking prescription medications ([Table 4](#)). Twelve patients (29%, 12/42) had a family history of hair loss, and 12 patients (20%, 12/61) had prior hair loss treatment with minoxidil, biotin, vitamin supplements, or intralesional triamcinolone injections ([Table 1](#)).

For the 37 patients with two of three known time values for date of COVID-19 infection, start date of hair loss, and hair status at follow up, we were able to track the time from infection to hair loss and the time from hair loss to recovery ([Figure 1A](#)).

Most patients contracted COVID-19 in March and April of 2020, as expected for our demographic. [Figure 1B](#) shows dates of hair loss initiation (N=55).



**Figure 1. Hair loss timeframes.** **A)** This graph includes all patients (N=37) for whom two of three endpoints are known: date of COVID-19 infection, start date of hair loss, date of hair loss outcome. Dotted lines indicate ongoing hair loss. **B)** This graph includes all patients (N=55) for whom hair loss onset date was known. For ease of visualization, values were rounded to the nearest whole number before plotting. **C)** Duration of hair loss for patients (N=15) whose hair loss start and end date are known, excluding those with hair loss prior to contracting COVID-19.

These patients cluster between March and July, that is, up to four months after infection.

The duration of hair loss ranged from two to 6 months in the 15 patients for whom this is known, with a mean duration of 3.9 months, SD 1. Four patients had ongoing hair loss, whereas 11 patients had cessation of loss. Six patients reported hair loss before they contracted COVID (if the date was known) or before March 2020 if it was not ([Figure 1C](#)).

## Discussion

Several reports describe TE during the COVID-19 pandemic from a variety of different countries including the U.S., Spain, Italy, Brazil, Japan, Turkey, and Switzerland [1,7-16]. Multiple reports note an increase in the prevalence of TE during COVID-19 compared to pre-pandemic [1,9,12], with one study

noticing the uptick two months after the pandemic began [8] and another 3-4 months after [11]. In New York City, one study found that the entirety of this increase related to TE in people of color, mostly Latinx patients [1]. Many studies have reported that hair shedding began 1-3 months after COVID-19 infection [7,10-13] and one found that fever was associated with increased hair shedding [11]. In our study, among the 15 patients for whom we have data, we found that on average, hair loss began four months after COVID-19 infection (**Figure 1C**). Indeed, Olds et al. found that the most common finding amongst 552 patients with a diagnosis of COVID-19 who went to a dermatology practice was TE and that hair shedding began on average 50 days after becoming symptomatic [13].

The majority of our patients were female and Latinx, not unexpected as most patients complaining of TE are women [17], and the majority of patients seen in our clinic are Latinx. Of note, 16 of our patients who had a chief complaint of hair loss did not know that they had previous COVID-19 infection (they had positive antibodies), so hair loss was likely the presenting symptom of COVID in most, if not all of these patients.

**Table 2.** Laboratory values of patients.

Lab	Number of patients (%)
<b>25-hydroxy vitamin D</b>	
Low	35 (53%)
Normal (32-100ng/mL)	10 (15%)
Unknown	21 (32%)
<b>ANA</b>	
High	10 (15%)
Normal (negative-1:80)	28 (42%)
Unknown	28 (42%)
<b>TSH</b>	
High	2 (3%)
Low	1 (2%)
Normal (0.234-4.020mIU/mL)	37 (56%)
Unknown	26 (39%)
<b>Zinc</b>	
Low	2 (3%)
Normal (68-161µg/dL)	34 (52%)
Unknown	30 (45%)
<b>Ferritin</b>	
Low	6 (9%)
Normal (10-291ng/mL)	39 (59%)
Unknown	21 (32%)

**Table 3.** Patient medical histories.

Medical history	Number of patients
Total patients with medical history	33
Hypertension	9
Hypercholesterolemia	8
Breast augmentation therapy	2
Asthma	6
Arthritis	5
Anxiety/major depressive disorder	7
Anemia	2
Diabetes mellitus	3
Breast cancer	1
Ovarian cancer	1
Hypothyroidism/hyperthyroidism	4
Gastroesophageal reflux disease	2
Hearing loss	1
Benign prostatic hyperplasia	1
Menopause/hot flashes	1
Psoriasis	1

Although there are a number of confounding variables potentially associated with COVID-related TE, including stress, weight loss, medication initiation, hospitalization, and laboratory abnormalities, a substantial portion of our patients who experienced sudden initiation or worsening of their hair loss did not have any of these confounders.

Nearly half of our cohort had preexisting medical conditions and were taking prescription medications; however, the acute nature of hair loss is not readily explained by these chronic conditions. Fifteen of our patients complained of weight loss preceding or coincident with hair loss, another possible confounder [18]. The acute nature of the hair loss and the fact that 33 patients did not complain of weight loss speaks to the likely possibility that COVID-19 was responsible for the TE in these cases. We did not screen for polycystic ovarian syndrome, which is a limitation in this study.

Using our laboratory reference values, over half of our patients had low 25-hydroxy vitamin D levels quantified as serum levels below 32ng/mL. Using the CDC's reference values, nearly 1/3 of our patients had low 25-hydroxy vitamin D levels, quantified as below 20ng/mL [6]. One study found that vitamin D levels below 20ng/mL were associated with an increased risk of COVID-19 infection, with the threshold being

lower for black individuals at less than 30ng/mL [19]. Chronic vitamin D deficiency is very common in our Latinx patient population and is associated with hair loss [20]. Although vitamin D deficiency can be associated with TE, its chronic nature also makes it an unlikely primary cause of our patients' acute hair loss.

Owing to the lack of follow up data for many of our patients, we do not have a clear picture of how many patients can expect to recover fully from COVID-related TE. As mentioned previously, for the 15 patients for whom we did have follow up, hair loss lasted between 2-6 months. Our data suggest that this form of TE is similar to other forms of TE in that many patients experience regrowth within several months.

We encourage testing for COVID-19 antibodies in patients that present with TE if they have not been vaccinated or are at high risk of contracting COVID-19 infection. Patients with suspected COVID-related hair loss should be worked up for other causes of TE; this may be a patient population that also has low vitamin D. Patients can also be reassured that COVID-related hair loss is most likely similar to other forms

of TE and recovery would be predicted within several months.

## Conclusion

We encourage testing for COVID-19 antibodies in patients that present with TE if they have not been vaccinated or are at high risk of contracting COVID-19 infection. Patients with suspected COVID-related hair loss should be worked up for other causes of TE; this may be a patient population that also has low vitamin D. Patients can also be reassured that COVID-related hair loss is most likely similar to other forms of TE, with recovery within several months.

## Potential conflicts of interest

Diana Gruenstein, Melissa O'Mara, Jack Tom and Marie Leger have no conflicts of interest to declare. Jacob Levitt has served on Advisory Boards for: UCB, Leo Pharma, Novartis, AbbVie, Arcutis Biotherapeutics, and consulted for Novartis and AbbVie.

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**Table 1:** Patient characteristics

Characteristics	Number (%)
<b>Total patients</b>	66 (100%)
Men	4 (6%)
Women	62 (94%)
<b>Ethnicity</b>	
Latinx	58 (88%)
Other (Caucasian, Tibetan, Unknown)	8 (12%)
<b>Disease severity</b>	
Symptomatic	50 (78%)
Asymptomatic	16 (24%)
<b>Hospitalized?</b>	
Yes	3 (5%)
No	54 (82%)
Unknown	9 (14%)
<b>Treated for COVID</b>	
Prescription Medications	3 (plaquenil, antibiotics, anticoagulants) (5%)
Over the Counter Medications	3 (5%)
No	46 (70%)
Unknown	14 (21%)
<b>Weight loss</b>	
Yes	15 (23%)
No	33 (50%)
Unknown	18 (27%)
<b>COVID-19 antibodies</b>	
Yes (tested in office)	53 (80%)
Yes (tested elsewhere)	6 (9%)
Unknown (reported symptoms and outside COVID-19 diagnosis)	7 (11%)
<b>Prior medical history</b>	
Yes	32 (48%)
No	33 (50%)
Unknown	1 (2%)
<b>Prescription medications</b>	
Yes	30 (45%)
No	35 (53%)
Unknown	1 (2%)
<b>Family history of hair loss (first degree relative)</b>	
Yes	12 (19%)
No	30 (45%)
Unknown	24 (36%)
<b>Prior hair loss treatments</b>	
Yes	12 (19%)
No	49 (74%)
Unknown	5 (8%)

**Table 4.** Patient medications.

Medications:	Number of patients
Total patients on medications	30
Secukinumab	1
Iron	2
Celecoxib	1
Fexofenadine	1
Rosuvastatin	3
Cetirizine	1
Raloxifene	1
Vitamin D +/- calcium	6
Simvastatin	2
Losartan	2
Metoprolol	5
Olmesartan	1
Alendronate	1
Metformin	2
Anastrozole	1
Atorvastatin	4
Diltiazem	2
Levothyroxine	3
Isotretinoin	1
Loratadine	4
Fenofibrate	2
Montelukast	1
Tamsulosin	2
Omega 3-6-9	1
Sertraline	1
Aspirin	2
Atenolol	1
Stromectol	1
Valacyclovir	1
Folic acid	1
Vitamin C	1
Mirtazapine	1
Diltiazem	2
Budesonide/formoterol	1
Doxycycline	2
Irbesartan	1
Pravastatin	1
Omega-3 acid ethyl esters	1