

# Telogen effluvium, Beau lines, and acral peeling associated with COVID-19 infection



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## INTRODUCTION

Since December 2019, SARS-CoV-2 has infected over 30 million people in the United States, accounting for over 550,000 deaths. While heroic public health efforts have led to increased screening and early detection, a large proportion of infected individuals remain asymptomatic during the acute viremic phase and may not manifest any signs or symptoms until the convalescent phase.<sup>1</sup> Within the dermatology community, there have been ongoing efforts to document the many cutaneous manifestations of COVID-19 as they may be the only sign of COVID-19 infection, and prompt diagnosis and management of disease may lead to better health outcomes.<sup>2</sup> COVID-19-associated cutaneous findings can mimic inflammatory skin conditions (morbilliform, urticarial, or vesicular) or resemble vascular dermatoses (pseudo-chilblains, purpura, or livedoid).<sup>3</sup> In addition, a late manifestation of COVID-19 has included Kawasaki-like multisystem inflammatory syndrome in children and recently in adults as well.<sup>4</sup> We present a novel case of a patient who developed skin, hair, and nail changes shortly following the resolution of COVID-19.

## CASE REPORT

A 41-year-old woman with a history of allergic rhinitis, diabetes mellitus, and hyperlipidemia presented to the emergency room in April 2020 with a 2-week history of dyspnea, nasal congestion, fever, sore throat, non-productive cough, and anosmia. Physical examination was notable for a temperature of 101.1 °F and crackles in the left lung base, whereas laboratory values were notable for transaminitis (alanine aminotransferase 169 U/L, aspartate

transaminase 111 U/L; normal ranges 8-40 U/L). Unfortunately, she did not get nasal swabbed for COVID-19 in the emergency department, given low suspicion at the time of acute illness. A normal chest radiograph eventually prompted her discharge home with ibuprofen and antitussive medication, after which she recovered within 1 week.

Two months later, in mid-June 2020, the patient began to notice significant hair and skin changes. She found redness of the distal fingers associated with peeling of the hands (Fig 1, A and B) and dense clumps of hair in the bathtub (Fig 1, C). She went to see her primary care physician, who obtained the COVID-19 IgG antibody test, which returned positive. By early August 2020, the patient also noted horizontal breakage and indentations in her fingernails (Fig 1, D). Apart from the COVID-19 infection, the patient denied having any other acute illnesses from April 2020 to August 2020. Her medications included fexofenadine-pseudoephedrine and fluticasone propionate to manage her allergic rhinitis and metformin to manage her diabetes mellitus.

When initially seen by dermatology in early December 2020, most of her cutaneous symptoms had improved or resolved without treatment. Her fingernails had regrown, with only residual Beau lines present at her distal fingernails. Examination of her scalp showed a normal density of hair with minimal hair extracted on the hair-pull test. Likewise, the erythema of her distal digits and acral desquamation of her hands had resolved. A review of her October 2020 laboratory findings showed normalization of her liver enzymes. Follow-up in April 2021 confirmed that there was no recurrence of her previous symptoms since her initial recovery.

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**Fig 1.** Initial hair, skin, and nail changes. Desquamation of the finger and palms with possible perniosis (A, B) and dense collections of hair in the sink due to telogen effluvium (C) that developed in June 2020, and later development of Beau lines on the fingernails (D) in August 2020.

## DISCUSSION

A sudden systemic event such as a viral illness can often disrupt the growth of keratinocytes of the skin, germinal follicles of the hair, and keratin of the nails. The pathophysiology of these cutaneous manifestations has not been extensively studied. However, it may be explained by the virus invoking a heightened systemic inflammatory response leading to cell cycle anergy or arrest of rapidly dividing cells.<sup>5,6</sup>

Telogen effluvium and Beau lines are both cutaneous changes associated with acute stressors. Telogen effluvium is characterized by diffuse hair loss often following a triggering event, such as severe illness, drugs, hormonal changes, or psychosocial stress. The pathophysiology involves the abrupt arrest of the hair cycle, during which large numbers of anagen hair follicles are prematurely triggered to enter the involution phase (catagen) and resting phase (telogen), resulting in sudden hair shedding (exogen) often after showering or during combing.<sup>5</sup> The interval between the inciting event or exposure and the hair loss is usually weeks to months and may continue for 6 months with spontaneous recovery.

Similarly, Beau lines are transverse grooves in the nail plate that result from a temporary arrest of proximal nail matrix proliferation often following local trauma, cutaneous diseases such as hand-foot-mouth disease, or severe febrile illnesses, including previously reported cases of COVID-19 infection.<sup>7,8</sup> The distance from the proximal nail fold to the leading edge of Beau line can be used to estimate the approximate elapsed time since the initial inciting factor.

Current evidence of the ongoing COVID-19 pandemic points to an exaggerated host immune response to SARS-CoV-2 infection as one explanation for the many manifestations associated with the illness. Systemic inflammation and microthrombi disrupting blood flow to cutaneous structures such as hair and nail stem cells are possible mechanisms explaining the development of telogen effluvium and Beau lines in our COVID-19 patient.<sup>5,9</sup> Furthermore, these inflammatory processes could increase the degradation of corneodesmosomes, the major cell-cell junctions in the stratum corneum of the epidermis, leading to subsequent desquamation and the physical appearance of dry, flaky, acral peeling seen in our patient.<sup>7</sup> Additionally, COVID-19 patients have been found to exhibit increased rates of strokes, microemboli, and venous thromboembolism due to an underlying hypercoagulable state.<sup>10</sup> There have been increased reports of acute liver failure associated with COVID-19 infection as a direct result of endothelial injury necessitating liver enzyme monitoring.<sup>11</sup> Lastly, associated cutaneous features of vasculopathic patients have included pernio-like acral eruptions, pseudo-chilblain, and livedo.<sup>3</sup> We felt that the erythema and edema demonstrated in our patient's distal fingertips qualified as pernio-like lesions associated with COVID-19 as she denied prolonged cold exposure.

The management of our patient involved addressing the underlying cause, which was self-limited in the case of her COVID-19 illness. As telogen effluvium and Beau lines may take 6-12 months to resolve completely, it is important to inform the patient that these cutaneous changes will eventually improve, and baseline appearances will be restored.<sup>5</sup> Since cutaneous manifestations may be the only presenting symptom in 12% of COVID-19 patients, continued research is warranted to characterize the spectrum of COVID-19 cutaneous manifestations completely.<sup>2</sup>

## Conflicts of interest

None disclosed.

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