

What can the hair tell us about COVID-19?

Abstract

The novel viral pandemic coronavirus disease 2019 (COVID-19) has sparked uncertainties as to its origin, epidemiology and natural course. The study of the cutaneous manifestations of COVID-19 has evolved with the hope that they may be useful as markers for the disease, prognostication and pathogenic insights into the disease. With regard to the hair, clinicopathological correlations have remained elusive. More recently, androgenetic alopecia and grey hair have been proposed as cutaneous markers for elevated severity risk. So far, we have only observed postinfectious effluvium in a causal association with COVID-19. The onset and acuity of hair shedding depended on the clinical severity of disease. There was complete recovery of hair.

While the novel viral pandemic coronavirus disease 2019 (COVID-19) has sparked uncertainties as to its origin, epidemiology and natural course, the medical community strives to contribute to a better understanding of the disease based on the best available evidence gained from the scientific method of observation and statistics.

The study of the cutaneous manifestations of COVID-19 has evolved with the hope that they may be useful as markers for the disease, prognostication, and pathogenic insights into the disease, and the respective investigations are to be commended.

With reference to the original work of Wambier *et al*¹ on androgenetic alopecia and COVID-19 severity, Müller Ramos *et al*² aimed at evaluating the hair condition in relation to COVID-19 based on a questionnaire-based population survey in Brazil. The authors analysed demographics, comorbidities, hair colour and amount of hair in relation to COVID-19 status, and severity outcomes. Obviously, they found that the prevalence of grey hair and baldness correlated with age, and, as expected, that disease severity was associated with age and particular comorbidities of the participants. Sex, age, ethnicity, comorbidities and their complex interdependencies in relation to COVID-19 call for a multivariate regression analysis, which the authors do not provide to support their claim that besides androgenetic

alopecia, as originally proposed by Wambier *et al*, grey hair may represent yet another independent risk factor for disease severity.

In the past, various dermatologic conditions have been investigated as cutaneous markers for elevated mortality risk. Among these have been those related to cardiovascular disease, such as the horizontal ear lobe crease, high breast hair density, precocious greying and alopecia. Ultimately, most have been scrutinized by others with regard to the accuracy and validity of the statistics and not been found to be convincing,³ including the work of Wambier *et al*.

So far, we have only observed postinfectious effluvium in a causal association with COVID-19. The demographic data, symptoms, hair and scalp manifestations, and outcomes of the indicator cases with confirmed SARS-CoV-2 infection seen in the ambulatory setting of our hair consultation clinic are summarized in Table 1.

Many factors can lead to a pathologically increased hair shedding. Whatever the cause, the follicle tends to behave in a similar way. While postinfectious hair loss has traditionally been categorized as telogen effluvium, it may present with different pathomechanisms and clinical patterns. Evidence exists, that the hair follicle may respond to infection with either dystrophic anagen effluvium and early onset or with telogen effluvium and late onset, depending on the type and intensity of the insult.

So far, single case reports of dystrophic anagen⁴ and of telogen effluvium⁵ in association with COVID-19 exist, though the former was not confirmed by light microscopic examination of the hair. In the latter, the trichogram was consistent with telogen effluvium. In general, the hair loss can be attributed to the multi-systemic inflammatory, febrile disease. As yet, evidence has not been provided for a pathogenic inflammatory reaction at the level of the hair follicle, or a direct infection of the hair follicle with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) resulting in inflammation and cell death. Scalp allodynia has not been a regular feature.

We observed ten patients with COVID-19, in whom the onset and acuity of postinfectious hair shedding were associated with the clinical severity of disease and fever. There was complete recovery of hair usually within 3-6 months (Figure 1A-C). We did not identify any risk pattern for severity relating to the pre-existing condition of the hair, specifically grey hair. All patients had pre-existent androgenetic alopecia, and recovered from COVID-19 within one day to 3 weeks (mean: 10 days, SD: ±6).

TABLE 1 Retrospective cohort study of 10 consecutive patients with a history of confirmed SARS-CoV-2 infection seen in the period from April 24 – November 25 2020 at the Center for Dermatology and Hair Disease

Patient No	Sex/ Age	Pre-existing hair condition	Fever	Anosmia/ Dysgeusia	Respiratory symptoms	Gastrointestinal symptoms	Disease duration	Scalp symptoms	Hair Loss			
									Onset	Duration	Recovery	Comorbidities
1	F/57	FAGA	High	Yes	Yes	Yes	2 weeks	No	Early	3-6 months	Yes	No
2	F/28	FAGA	High	Yes	Yes	No	2 weeks	No	Early	3-6 months	Yes	No
3	F/78	FAPD Grey hair	No	Yes	No	Yes	10 days	No	No	No	No	Hypercholesterolaemia
4	F/74	FAGA Grey hair	Moderate	No	Yes	No	10 days	Allodynia	Late	3-6 months	Yes	Hypothyroidism
5	F/55	FAGA Grey hair	High	Yes	Yes	No	2 weeks	No	Early	3-6 months	Yes	No
6	M/26	MAGA	Moderate	Yes	Yes	No	3 weeks	No	No	No	No	Obesity
7	F/77	FAGA Grey hair	No	No	No	No	1 day	No	No	No	No	Hypercholesterolaemia
8	M/43	MAGA	Moderate	No	No	No	1 day	No	No	No	No	No
9	F/76	FAPD Grey hair	No	Yes	No	Yes	10 days	No	No	No	No	Hypothyroidism
10	M/41	MAGA	No	Yes	No	No	3 days	No	No	No	No	No

Note: Demographics, pre-existing hair condition, symptoms of COVID-19, hair and scalp manifestations, and outcomes in patients.

Abbreviations: FAGA, female androgenetic alopecia, MAGA, male androgenetic alopecia, FAPD, fibrosing alopecia in a pattern distribution, early onset hair loss: <3 months (mixed dystrophic anagen/ telogen effluvium), late onset hair loss: >3 months (telogen effluvium).

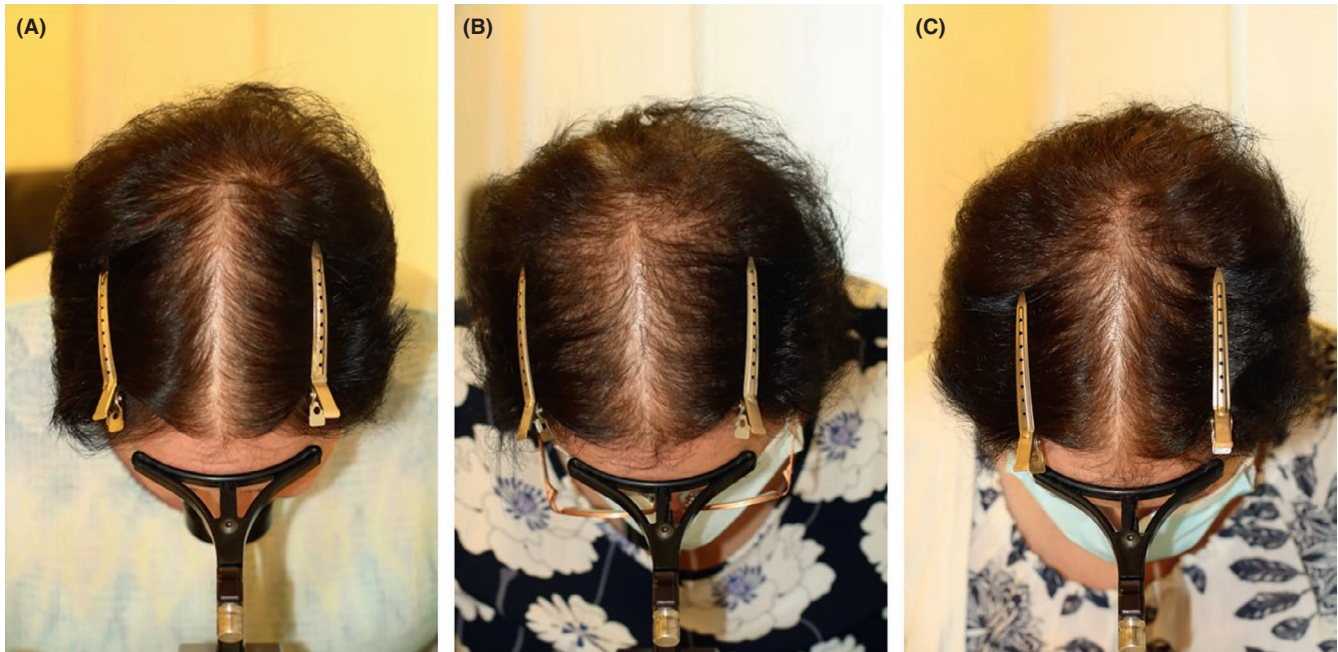


FIGURE 1 A-C, COVID-19 related postinfectious effluvium in a 57-year old female (A) before, and (B) 4 months following confirmed infection with SARS-CoV-2, (C) with recovery of hair after another 3 months

KEYWORDS

alopecia, COVID-19 severity, dystrophic anagen effluvium, grey hair, telogen effluvium

CONFLICT OF INTEREST

None reported

AUTHOR CONTRIBUTIONS

Professor Trüeb take responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: not applicable. Acquisition, analysis, and interpretation of data: not applicable. Drafting of the manuscript: Trüeb, Gavazzoni, and Dutra. Critical revision of the manuscript for important intellectual content: Trüeb, Gavazzoni, and Dutra. Statistical analysis: not applicable. Obtained funding: not applicable. Administrative, technical, or material support: not applicable. Study supervision: not applicable

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