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Case Report

Alopecia areata in a patient with coronavirus disease of 2019

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Abstract Pandemic coronavirus disease (COVID-19) caused by coronavirus 2 (SARS-CoV-2) causes a severe acute respiratory syndrome affecting primarily the airway epithelium. With the increasing involvement of dermatologists in managing this crisis, skin symptoms are receiving more and more attention. In this case, we will describe alopecia areata in a 7-year-old girl associated with COVID-19.

Key words
Androgenetic alopecia, COVID-19, SARS-CoV-2.

Introduction

Coronavirus disease 2019 (COVID19) is a viral infection caused by coronavirus type 2 (SARSCoV2) that causes severe acute respiratory syndrome. SARSCoV2 originated in the Chinese city of Wuhan and has spread around the world. The new coronavirus (COVID19) has been declared a pandemic by the World Health Organization (WHO). Since the emergence of the novel coronavirus SARSCoV2, much attention has been paid to its life-threatening cardiovascular and pulmonary manifestations. In patients with diseases of the cardiological system a worse course is observed of the disease. This also applies to hypertensive and diabetic patients. However, cutaneous signs and symptoms of the disease have also been described and can have a significant impact on patients.[1,2] Especially because COVID19 is associated with exacerbation of underlying autoimmune diseases as well as the onset of new diseases.[3] Herein, we present a case of autoimmune alopecia areata (AA) in our patient who tested positive for COVID19.

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Case report

A 7-year-old girl with scalp hair loss in bunions on the back and sides of the head from two months (Figures 1a and 1b). On clinical examination, no deep atrophy or concave bone was found. The skin underneath is not scarred and has a normal appearance. Her father did not mention any other underlying illnesses and denied taking any medication in the past year. There was no family history of AA and other autoimmune diseases. Our diagnosis was confirmed AA by endoscopic trichoscopy. Dermatoscopy (after wiping the skin with alcohol) revealed broken hairs, black dots, yellow dots, and short streaks of hair.

Figures 1 Areas of nonscarring alopecia involving the occipital area in a 7-year-old child.

A 10% KOH smear was negative. It is known from the interview that the patient's parents contracted COVID-19 at the beginning of November 2020 (confirmed by a nasopharyngeal smear). In our patient, the first skin lesions in the form of round patches appeared at the end of November 2020. The child was in isolation, but did not show signs of COVID-19 infection (possibly asymptomatic). On February 2, 2021, she was tested for IgG against SARS-CoV-2 (SARS-CoV-2 IgG: 861,50 (N <0,80). In other deviations from the norm in lab tests: ferritin: 11,0 ng/ml (N 15,0 – 150,0). Clobetasoli propionas in solution was included in the treatment, with little improvement. The girl is under constant observation.

Discussion

Alopecia areata (AA) is non-scarring hair loss. This process can be intensify of psychological stress. In the pathogenesis of the disease autoimmunity plays an important role. The part of studies indicate its association with other autoimmune diseases. Vitiligo or type I diabetes are mentioned. Kutlu Ö et al. studied the proportion of patients with alopecia areata in May 2020 and compared with the same month last year. These authors determined that the incidence of patchy hair loss was 1.48% after the COVID19 pandemic, while the rate was 0.97% before the COVID19 pandemic. Viral infections are involved in autoimmune pathogenesis. What the theory of molecular mimicry, viruses may have antigens that cross-react with their own antigens, thereby triggering an immune response against host tissues. As stated in the bystander theory, the release of cosmological excitatory signals the presence of pathogens increases that allow dendritic cells to more efficiently present antigens, both autophagic and autoantibodies.

If that happens in people with a genetic predisposition, autoactivation of T-cells can develop and progress. Hence, antigens (expressed at the level of the cysts) are recognized and next attacked by the immune system. The psychological impact is important, but the authors of this publication think that SARS-CoV-2 has an important role as a provocation to appear of AA. The etiology of the disease is still unknown, but several studies have shown that in the pathogenesis of AA, cytokines play an important role. Interferon-γ (IFNγ) is the major cytokine known to be abnormally expressed in AA by a CD4+ Th1 mediated response. IFNγ appears to be a useful indicator of AA activity and play an important role in the development of AA.[5]

COVID 19 may act as an activator in various autoimmune roads/pathways. The process is twofold. One by creating an inflammatory

environment, as allows for nonspecific activation of the immune system. Two by cross-reactivity. This pathway is interaction between antigens and host antigens. Bulat et al reported overactivation of T cells in patients with COVID19, whereby there is growth the Th17 subset of CD4 T cells.[6] Accordingly, we are observing increased production of interleukin-17 (IL17) and IL-22 cytokine, the main contributors to the cytokine storm of release (CRS) resulting in a rapid and severe deterioration of the patient's condition with COVID19.[7] AA itself is implicated in dysregulation of systemic cytokines type 17 and type 2, and IL-17 is considered as a target for AA treatment.[8] Actually, IL-17 represents a systemic inflammatory marker of AA and more interestingly, it has also been reported to contribute to the psychopathology associated with this disease.[9] The stress associated with the COVID-19 pandemic is expected to increase many psychiatric-related dermatological diseases, including psoriasis, prurigo nodularis, chronic urticaria, and alopecia areata.

Considering the importance of mental disorders in AA, in the wake of the COVID19 pandemic, many stressors such as travel bans, social distancing, gatherings, and public transport restrictions are starting to emerge. Rising unemployment and death rates due to the COVID-19 pandemic have contributed to further stress. All of these factors can increase the risk of alopecia areata during the COVID19 pandemic.[4,10,11] In addition, given the significant that the COVID-19 pandemic on mental health, psychological stress is an another possible risk factor for AA. It is considered that alopecia areata may have more to do with short-term stress (<2 months) than long-term stress.[4] Psychological stress can initiate or worsen inflammatory skin diseases through the neuroendocrine system, an important link between the brain and skin. Recent studies have demonstrated the safety of dermatological immunosuppressive treatment during the COVID19 pandemic.[12,13]

Immunocompromised patients also had a more severe course or were receiving immunosuppressive drugs, including the JAK inhibitor (JAKi) – tofacitinib.[14] Tofacitinib is becoming an important drug in the treatment of AA. The drug has mild adverse effects. Among the most common side events was described upper respiratory tract infections.[15] Several studies suggest that inhibition of the JAK/STAT pathway could be a potential application for the later stages of COVID19.[16] We used topical steroids to treat our patients. Many factors, such as impact on quality of life, perceived risk, increased stress load, can lead to variation, also in the diagnostic and therapeutic distribution of dermatological applications.

Conclusion

- We speculate that SARS-CoV-2 and COVID19 as disease may be an additional risk factor in the pathogenesis of AA.
- Psychological stress related with the COVID-19 pandemic appears to be a possible risk factor for AA.
- The COVID19 pandemic has highlighted the importance of dermatological disorders associated with psychiatric conditions
- Are needed follow periodic follow-up of your patients. The long-term effects of SARS-CoV-2 infection is being analyzed.
- If a patient in a COVID19 quarantine has an episode of alopecia areata, can we talk about a COVID19 link?

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