Introduction

In March 2020, the WHO declared a global pandemic as a result of the new coronavirus SARS-CoV-2, causing a disease characterized by acute respiratory distress syndrome, called COVID-19 [1]. As a result of the rapid spread, the number of infected and deceased reaches proportions that require the development of effective vaccines, necessary to end the pandemic and return society to normal everyday life [2]. To date, according to WHO data, 11,250,782,214 vaccination doses have been administered [3]. Vaccination is considered one of the greatest achievements of medicine in modern civilization – thanks to it, smallpox was eradicated, which is among the best examples of how vaccination saves lives [4].

Gambichler, T. et al. describe skin reactions after vaccination against COVID-19, among which non-specific events at the injection site are the most common. Type 1 hypersensitivity reactions (e.g., urticaria, angioedema and anaphylaxis) can be severe, but occur less often – with allergy to any of the ingredients. Type 4 hypersensitivity reactions may also be observed, including large local skin lesions “Covid-hand”, inflammatory reactions of old BCG vaccine scars, morbilliform rash, etc. Autoimmune-mediated skin changes following vaccination against COVID-19 include leukocytoclastic vasculitis, lupus erythematosus, and immune thrombocytopenia. Pityriasis-rosea-type rashes and herpes zoster reactivation have also been described after vaccination against COVID-19 [5].

Alopecia areata is an autoimmune condition that can present with lesions of different sizes – from small spots to large areas leading to total or subtotal alopecia. Histologically, alopecia represents a perifollicular T-cell colonization that interferes with hair follicle growth through the skin [6]. With the onset of the pandemic in the last two years, skin manifestations have become more common in patients who have experienced COVID-19, which could be explained by the exacerbation of underlying autoimmune diseases or the emergence of new ones [7]. On the other hand, it can be related to the stress caused by the imposed lockdown and quarantine – it has been proven that stress can exacerbate or unmask various autoimmune diseases [8]. A national study was conducted in Spain on mucocutaneous reactions after vaccination against SARS-CoV-2 with the BNT162b2 (Pfizer-BioNTech), mRNA-1273 (Moderna) and AZD1222 (AstraZeneca) vaccines. Within 3 months, 405 cases of reactions were collected, the most common of which were: 1) local (32.1%), 2) urticaria (14.6%), 3) morbilliform rash (8.9%), 4) papulovesicular rash (6.4%), 5) pityriasis rosea-like rash (4.9%), 6) purpuric rash (4%) [9]. Documenting these adverse events provides useful information to physicians as well as guidelines for behavior and therapeutic algorithm.

A CLINICAL CASE OF A PATIENT WITH MUCOCUTANEOUS AND MUSCULOSKELETAL MANIFESTATIONS AFTER COVID-19 VACCINATION

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Abstract. With the onset of the global pandemic due to the new virus SARS-CoV-2 and the development of vaccines against it, various adverse events have been reported to them. We present a clinical case of a 53-year-old Caucasian woman who presented one week after Pfizer vaccination against SARS-CoV-2 with severe muscle weakness, myalgia in upper and lower extremities, alopecia 2 cm in diameter, and two mucosal ulcerations on lower lip. No deviations from the hematological, biochemical and immunological indicators were found from the laboratory tests carried out. Two weeks later, the patient developed total alopecia on the scalp. Due to the causal relationship with the administered vaccine, the patient was not given a second dose and a diagnosis of Systemic Connective Tissue Disease was not accepted. Six months later, recovery and partial hair growth was observed in the affected areas of the capillitium. Alopecia areata is autoimmune in nature, with literature reporting initial or recurrent alopecia after vaccination. It is important that adverse events after vaccination are properly evaluated in order to choose a proper therapeutic approach.

Key words: COVID-19, SARS-CoV-2, vaccination, adverse events, alopecia areata
**Clinical case**

It concerns a 53-year-old Caucasian woman diagnosed with Raynaud’s phenomenon since adolescence (without comorbidities) who was vaccinated against SARS-CoV-2 in June 2021. A week later, the patient presented with severe muscle weakness, myalgia in the upper and lower limbs, alopecia with a diameter of 2 cm and two mucosal ulcerations on the lower lip. Over the course of a week, the complaints continued to worsen to the point of inability to perform daily activities. Alopecia gradually covers almost the entire fronto-parietal area. No deviations from hematological and biochemical indicators were found from the laboratory tests performed (ESR and CRP are within reference limits). Creatine phosphokinase, anti-dsDNA, C3, C4, ANA, anti-Jo1 and other myositis-associated antibodies were negative. An electroneuromyography (ENMG) was performed, which was without abnormalities. The patient takes symptomatic non-steroidal anti-inflammatory drugs (NSAIDs) and applies topical corticosteroid creams to the areas affected by alopecia. Two weeks later, the patient experienced total alopecia in the described areas, but a significant improvement in the manifestations of the musculoskeletal system (up to their absolute elimination). A skin biopsy was performed from the affected area, which revealed an unchanged epidermis, a reduction in the number of hair follicles and a tendency for "vellus-like" transformation and lymphocytic infiltration. The histological picture is consistent with non-cicatricial alopecia. Due to the lack of data on systemic connective tissue disease and the causal relationship with the administered vaccine, the patient was not administered a second dose. Six months later, recovery and partial hair growth was observed in the affected areas of the capillitium.

![Fig. 1](image1)
![Fig. 2](image2)
![Fig. 3](image3)

![Fig. 4](image4)
![Fig. 5](image5)
**Discussion**

Several cases of alopecia areata occurring after vaccination against tetanus, hepatitis B, and others have been described in the literature [10, 11]. Reham Essam et al. first reported a case of alopecia areata that appeared a few days after vaccination against SARS-CoV-2 with Astra Zeneca vaccine [12]. Soon after, Giuseppe Gallo et al. also reported a case of alopecia areata occurring in a 31-year-old female patient after vaccination against SARS-CoV-2 with a Pfizer BioNTech vaccine [13]. Scollan ME et al. describe a clinical case series of patients with a family history of alopecia, 67 of alopecia areata, 1 of alopecia totalis, and 8 of alopecia universalis to date related to the vaccines of Pfizer or Moderna [17]. This case series highlights that patients with a personal or family history of alopecia areata and other autoimmune diseases, especially thyroid dysfunction, may be at higher risk of hair loss after SARS-CoV-2 vaccination [18].

**References**

3. https://cov19.who.int/ 11 April 2022