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Hidradenitis suppurativa and psoriasis coexistence in patients with Down syndrome: A case series

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ABSTRACT

Down syndrome is the most common chromosomal disorder associated with skin conditions, including psoriasis and hidradenitis suppurativa. Patients with Down syndrome are more likely to be overweight or obese and diagnosed with metabolic comorbidities such as cardiovascular disorders, inflammatory joint diseases as in psoriasis and hidradenitis suppurativa. Although both hidradenitis suppurativa and psoriasis are associated with Down syndrome, concurrent psoriasis and hidradenitis suppurativa in the same patient with Down syndrome have not been reported in the literature. Here, we describe three patients with Down syndrome having both hidradenitis suppurativa and psoriasis by discussing the common etiopathogenesis considering the current literature.

Introduction

Down syndrome or trisomy 21 is the most common chromosomal abnormality, with a worldwide incidence of 1 in 800 live births. Besides the common phenotypic characteristics such as upslanted palpebral fissures, flattened nasal bridge, nuchal folds, and single palmar flexion crease, individuals with Down syndrome have a higher risk of congenital anomalies and multiorgan comorbidities, including skin disorders (1). Follicular occlusion disorders are frequently observed in patients with Down syndrome, and hidradenitis suppurativa is one of the most common follicular conditions following folliculitis, keratosis pilaris, and acne vulgaris (2). Psoriasis prevalence is also observed higher in patients with Down syndrome compared to

controls, even though the exact association between psoriasis and Down syndrome has not been established yet (3). Psoriasis and hidradenitis suppurativa share common immunologic and inflammatory pathways in pathogenesis. In a large-scale population study, it has been shown that there is a significant association between psoriasis and hidradenitis suppurativa (4). However, as far as we know, the coexistence of these disorders has not been previously described in patients with Down syndrome.

Here, we report three patients with Down syndrome being affected by hidradenitis suppurativa and concomitant psoriasis, describe their clinical features, and discuss the common etiopathogenetic pathways.

Case Presentation

The demographic and clinical characteristics of three patients with Down syndrome who had also been diagnosed with both psoriasis and hidradenitis suppurativa are provided in Table 1. All patients were male, obese with a body mass index over 30 kg/m², and had congenital thyroid disorders in common. Case 1 had epilepsy and recurrent lower respiratory tract infections. Case 2 had a history of acute lymphoblastic leukemia and familial Mediterranean fever. None of the patients had a family history of hidradenitis suppurativa or psoriasis. The severity of hidradenitis suppurativa was Hurley stage 2 in case 1 and case 3, and Hurley stage 1 in case 2. The type of psoriasis was plaque-type in all patients. Figures 1 and 2 represent the lesions of the hidradenitis suppurativa and psoriasis of Case 1, respectively. Previous treatments of the patients for hidradenitis suppurativa and psoriasis are shown in Table 1. Case 1 was given oral acitretin with a dose of 25 mg/kg per day and the psoriatic lesions improved significantly, but hidradenitis suppurativa lesions did not show sufficient improvement in the three-month period of the treatment. Cases 2 and 3 have been under topical corticosteroid treatment for psoriasis with excellent response. Case 2 benefited from topical clindamycin 2% solution for hidradenitis suppurativa lesions, while oral doxycycline 200 mg BID treatment showed efficacy in case 3.

Discussion

Hidradenitis suppurativa is one of the most common skin disorders in patients with Down syndrome, and the risk of hidradenitis suppurativa is five times higher in patients with Down syndrome than in the normal population (5,6). It has been shown that Down syndrome-related hidradenitis suppurativa appears earlier in life and shows a mild or moderate disease course as in current cases staged as Hurley 1 and 2 (7). The genetic background of hidradenitis suppurativa is based on disrupted notch signaling due to loss-of-function mutations in the genes encoding gamma-secretase transmembranous enzyme complex (8). Blok et al. (9) have suggested that the association between hidradenitis suppurativa and Down syndrome results from the overexpression of the amyloid precursor protein (APP) gene, located on chromosome 21. APP and notch receptors are competitive substrates for the gamma-secretase transmembranous enzyme complex. Thus, increased APP expression may lead to the disruption of notch signaling. Increased expression of APP and consequent notch signaling impairment may stimulate impaired keratinocyte adhesion, migration, and proliferation, causing follicular plugging, which is thought to play a significant role in hidradenitis suppurativa pathogenesis (9). Besides, impaired notch signaling pathways may contribute to the dysregulation of the inflammatory response in patients with hidradenitis suppurativa and Down syndrome.

Table 1. Demographic and clinical characteristics of the patients with Down syndrome having both hidradenitis suppurativa and psoriasis

Characteristics	Case 1	Case 2	Case 3
Age (years)/gender	27/male	24/male	20/male
Body mass index (kg/m ²)	34.2	32	42.6
Family history for hidradenitis suppurativa	No	No	No
Onset of hidradenitis suppurativa	17 years old	15 years old	19 years old
Hidradenitis involvement	Axilla, inguinal folds, abdomen, pubic and intergluteal region	Back	Axilla, intergluteal region
Hurley stage of hidradenitis suppurativa	2	1	2
Family history of psoriasis	No	No	No
Onset of psoriasis	13 years old	20 years old	18 years old
Type of psoriasis	Vulgaris	Vulgaris	Vulgaris
Psoriasis involvement	Dorsum of the hands and feet, bilateral shins, fingernails, and toenails	Dorsum of the hands and fingers, bilateral elbows	Dorsum of the hands, bilateral elbows
PASI score	8	1.6	1.8
Comorbidities	Epilepsy, hypothyroidism, Recurrent lower respiratory tract infections	ALL, FMF, hyperthyroidism	Hypothyroidism
Concomitant treatments	Levothyroxine, levetiracetam, sodium valproate	Allopurinol, colchicine	Levothyroxine

ALL: Acute lymphoblastic leukemia, FMF: Familial Mediterranean Fever, PASI: Psoriasis area severity index

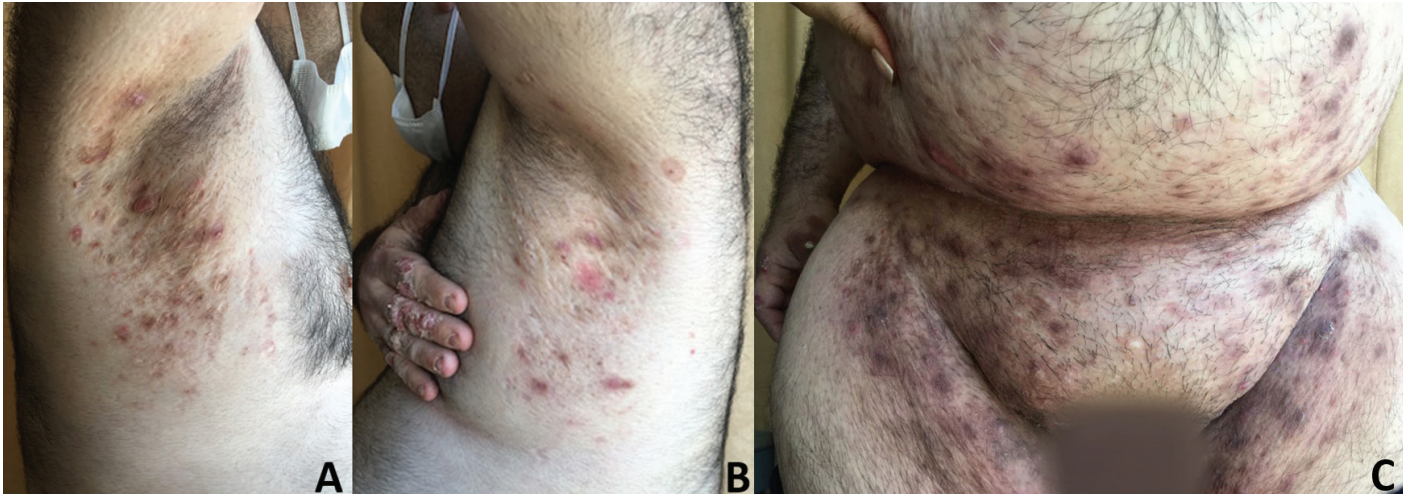


Figure 1. Hidradenitis suppurativa lesions of case 1: Multiple abscesses, postinflammatory hyperpigmented and atrophic scars in axillary (A, B), abdominal, pubic, and inguinal regions (C)



Figure 2. Psoriasis skin and toenail involvement of case 1: Erythematous papules and plaques with a silvery scale on the dorsal aspect of the hands (A, B) and the feet, and yellow discoloration and subungual hyperkeratosis on toenails, well-demarcated brownish-red patches on anterior tibial surfaces (C)

Psoriasis is an immune-mediated and chronic inflammatory skin disorder (10). The frequency of psoriasis in patients with Down syndrome has been demonstrated to be approximately 9% (2,6). As these data are based solely on case studies, the relationship between psoriasis and Down syndrome remains to be elucidated. It has been proposed that the high frequency of psoriasis in patients with Down syndrome is related to elevated serum levels of tumor necrosis factor (TNF)-alpha, interleukin (IL)-1 beta, and interferon (IFN)-gamma (4). All of which are thought to be involved in psoriasis pathogenesis and high serum levels of INF-gamma and increased sensitivity to IFN-gamma due to chromosome 21 ploidy in patients with Down syndrome (3).

The IL-23/Th17 and TNF-alpha pathways are common in the molecular pathogenesis of psoriasis and hidradenitis suppurativa. Further, psoriasis and hidradenitis suppurativa share common aggravating factors and comorbidities such as smoking, obesity, and metabolic syndrome (4). Patients with the dual diagnosis of hidradenitis suppurativa and psoriasis have been revealed to have a higher prevalence of obesity (4,11). Obesity occurs in more than 50% of adults with Down syndrome (1). Thus, the association between Down syndrome, hidradenitis suppurativa, and psoriasis may be attributed to the common pathophysiological mechanisms: dysregulated notch signaling and inflammatory mechanisms, and obesity.

Psoriasis and hidradenitis suppurativa share common therapeutic options due to similarities in their pathogenic mechanisms (4). As patients with Down syndrome have a mild severity of hidradenitis suppurativa and psoriasis, treatment with topical corticosteroids and antibiotics may be sufficient to control the diseases (7). Oral acitretin and adalimumab, showing high efficacy on both hidradenitis suppurativa and psoriasis, may be required options in recalcitrant and moderate to severe cases (11,12). However, comorbidities requiring multiple medications and a dysregulated immune system ensuing susceptibility to infections and malignancies in Down syndrome may restrict treatment options (1). Dermatologists should exercise caution, and close follow-up should be recommended when using these treatments in patients with Down syndrome.

Conclusion

In conclusion, the coexistence of hidradenitis suppurativa and psoriasis in patients with Down syndrome is rare but should be kept in mind. Patients with Down syndrome should be carefully examined for accompanying dermatologic disorders. The management of the condition is challenging; hence, patients should be monitored closely after appropriate treatment selection.

Ethics

Informed Consent: Consent form was filled out by all participants.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices - Concept - Design - Data Collection or Processing - Analysis or Interpretation - Literature Search - Writing: N.D.Ö., P.E., E.Ç.

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