Abstract Category: (A) Clinical Research

Mass Cytometry Profiling Reveals Immune Dysregulation in a Transgender Woman with Concomitant HIV and Hidradenitis Suppurativa Undergoing Estrogen Therapy

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Background: Hidradenitis suppurativa (HS) and human immunodeficiency virus (HIV) are well-documented diseases, and literature exists on HS in transgender individuals. However, the triad of HS, HIV, and transgender status has not been previously reported. This case report presents a unique patient with longstanding HS, HIV, and recent initiation of gender-affirming hormone therapy (GAHT). In the United States, HS is female-predominant, and in female-to-male transitions, testosterone gender-affirming hormone therapy (GAHT) appears to exacerbate HS, whereas spironolactone may improve it. However, the impact of estrogen GAHT on HS in male-to-female (MTF) transgender women remains poorly understood. HIV-associated CD4+ T cell depletion and chronic inflammation further complicate this interplay, as antiretroviral therapy (ART) does not fully resolve immune dysregulation. This novel case aims to characterize the immunologic profile of a patient with a unique triad of well-controlled HIV (undetectable viral load, CD4: 864 cells/μL), longstanding severe Hurley Stage 3 HS, and estrogen GAHT.

Clinical Case: A 51-year-old transgender woman presented with a 20+ year history of stage 3 HS, predominantly affecting the buttocks, perineum, and axillae. She was diagnosed with HIV in 2013 and had a 36-pack-year smoking history. Previous HS

treatments included benzoyl peroxide, topical clindamycin, and oral antibiotics with limited success. In May 2022, she initiated GAHT with estradiol and spironolactone, reducing HS flares.

Methods: We conducted a comprehensive immune profiling using mass cytometry by Time of Flight (CyTOF). The patient's sample was compared to age, race, gender, and Hurley stage-matched cohorts of women with HS only (n=7) and healthy controls (HC) without HIV, HS, or GAHT (n=7). Mean percentages of immune cell subsets from control cohorts were used for group comparisons. Data were analyzed with MaxPar Pathsetter and GraphPad Prism.

Results: CyTOF analysis revealed diminished CD4+ T cells (30% vs 73% HC; 68% HS) and increased CD8+ T cells (67% vs 20% HC; 27% HS) consistent with CD4 labs. We also observed a skewed immune profile, displayed by reduced Naive populations (CD4+ T cells: 4% vs. 33%(HC);26%(HS); CD8+ T cells: 17% vs. 40% (HC);25%(HS); B cells: 37% vs. 77%(HC);76%(HS); NK cells: 23% vs. 60%(HC);60%(HS)) and elevated Memory populations (Central Memory [CM] CD4+ T cells: 61% vs 26%(HC);32%(HS); CM CD8+ T cells: 25% vs 8%(HC);11%(HS); B cells: 58% vs 19%(HC);22%(HS); NK cells: 77% vs 40%(HC);40%(HS)). Notably, Th17-like cells were increased (12% vs 9%(HC); 7%(HS)), and plasmacytoid dendritic cells were robustly elevated (58% vs 37%(HC); 33%(HS)). Vitamin D deficiency (25 ng/mL) was noted as a modifiable HS risk factor.

Clinical Lessons: This case highlights the complex interplay between HS, HIV, and GAHT in a transgender woman. The immune profile suggests HIV-driven dysregulation with impaired naive immune responses but retained capacity for robust memory responses, indicative of chronic viral inflammation. Importantly, the patient experienced an improvement in HS symptoms following GAHT initiation.

Conclusion: This novel case report emphasizes the need for personalized treatment and GAHT protocols in transgender patients with comorbid HIV and HS. The findings advocate for comprehensive immune profiling to optimize therapeutic outcomes in complex cases.