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Evidence for the association of Hashimoto's thyroiditis with psoriasis: a cross-sectional retrospective study

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Abstract

Background—Current information indicates that psoriasis is a metabolic disorder with systemic manifestations. Reports have revealed an association between psoriasis and several chronic autoimmune disorders. For one of these disorders, Hashimoto's thyroiditis, there are scarce, and relatively unconfirmed, reports of an association with psoriasis. We sought to determine if such an association is detectable in a large medical record data repository.

Methods—We searched one institution's electronic medical record data repository from January 2010 to December 2013. Patients were identified by ICD-9 codes (psoriasis: 696.0; 696.1, Hashimoto's thyroiditis: 245.2). Only data from patients with laboratory-confirmed Hashimoto's thyroiditis (anti-thyroid peroxidase (anti-TPO) antibodies; thyroglobulin antibodies; serum TSH and free T3) were eligible for inclusion. Logistic regression analysis was used to obtain an odds ratio (OR) to establish an association between psoriasis and Hashimoto's thyroiditis. Stratified analyses were performed to test for confounding variable and effect modification.

Results—Medical records for 856,615 individuals with documented encounters between January 1, 2010 and December 31, 2013 were detected. 9,654 had a diagnosis of psoriasis and 1,745 had a diagnosis of Hashimoto's thyroiditis. Of these, 41 subjects were diagnosed with both conditions. A significant association existed for psoriasis and Hashimoto's thyroiditis, even after adjusting for confounding variables that included sex, age, psoriatic arthropathy and the use of systemic anti-psoriatic agents (OR=2.49; 95%CI 1.79–3.48; $p < 0.0001$).

Conclusions—This association has broad clinical impact and deserves further attention with regards to patient care, clinical research, and developmental therapeutics.

Keywords

psoriasis; Hashimoto's thyroiditis; comorbidities; metabolic syndrome; autoimmune diseases

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Introduction

Psoriasis is a chronic, immune-mediated, inflammatory skin disorder affecting up to 3% of the world's population¹. It negatively affects clinical outcome, and psychosocial health^{2; 3}. Psoriasis is associated with a variety of other morbidities including metabolic syndrome, diabetes mellitus, cardiovascular disease⁴ as well as with other inflammatory autoimmune diseases such as rheumatoid arthritis, celiac disease and Crohn's disease.⁵

Hashimoto's thyroiditis (HT) is a chronic autoimmune disorder⁶ of unknown etiology affecting nearly 2% of the general population⁷, and characterized by lymphocytic infiltration of the thyroid gland along with circulating anti-thyroid antibodies and increased serum levels of thyroid-stimulating hormone (TSH)⁸. Notably, unlike psoriasis, HT is ten times more prevalent in women than in men^{7; 9}.

The co-existence of psoriasis and autoimmune thyroiditis suggests a possible association between these two conditions¹⁰. However, a link between these two disorders has yet to be established. We sought to determine if an association existed between psoriasis and HT in a large, urban, academic-based, electronic medical record data repository.

Materials and Methods

We conducted a cross-sectional study to determine if an association between HT and psoriasis was detectable in a large data repository, the Northwestern Medicine Enterprise Data Warehouse (NMEDW), consisting of Electronic Medical Record (EMR) data for over 8 million individuals. Data were limited to clinical encounters that took place between January 1, 2010 and December 31, 2013. Baseline characteristics included the patient's age, gender, race, and diagnoses of both psoriasis and HT. Data on psoriatic arthritis were also collected. Data on the use of systemic anti-psoriatic agents, both biological agents (infliximab, adalimumab, etanercept, golimumab, certolizumab pegol and ustekinumab), as well as non-biological anti-psoriatic agents (methotrexate, cyclosporine, acitretin), were collected. Psoriasis, psoriatic arthritis and HT diagnoses were collected using ICD-9 codes (ICD-9 CM 696.1; 696.0 and 245.2 respectively). Considering the relatively non-specific clinical symptoms and insidious onset of HT, only those patients with laboratory data (anti-thyroid peroxidase (anti-TPO) antibodies; thyroglobulin antibodies; serum TSH and free T3) that confirmed HT were included for analyses. The control populations consisted of all individuals who had an encounter between January 1, 2010 and December 31, 2013 (within the same EMR repository) who did not meet inclusion criteria. Logistic regression analysis was used to determine the odds ratio (OR) for an association between psoriasis and Hashimoto's thyroiditis. The dependent variable was Hashimoto's thyroiditis (HT) and the OR was defined as the odds of HT in the presence of psoriasis divided by the odds of HT in the absence of psoriasis. Multivariate logistic regression was used to adjust this analysis for potential confounders such as age, gender, psoriatic arthritis and the use of biological and non-biological anti-psoriatic systemic agents.

Results

A total of 856,615 individuals were determined to have medical record documentation of an encounter between January 1, 2010 and December 31, 2013. Of these, 9,654 had a diagnosis of psoriasis and 1,745 had a diagnosis of HT. For these patients, 41 patients were diagnosed with both disorders (35 female/6 male; mean age: 49.9 years, SD: +16.7; range: 30–74). After adjusting for potential confounding factors such as age, gender, psoriatic arthritis, and the use of systemic anti-psoriasis agents, a significant association for psoriasis with HT, (OR=2.49; 95%CI 1.79–3.48; $p < 0.0001$) was detectable. In addition, a significant association for HT with psoriatic arthritis was detectable ($p=0.04$). No significant association was detectable for HT and the use of systemic biological agents as well as for non-biological systemic anti-psoriasis agents (biological agents $p=0.82$; non-biological agents $p=0.96$).

Discussion

Psoriasis may be associated with various autoimmune disorders, including, for example, celiac disease (CD), along with an increased prevalence of elevated CD-associated antibodies in CD patients with psoriasis¹¹. A significant association for psoriasis with several classic autoimmune disorders: rheumatoid arthritis, systemic lupus erythematosus, Sjogren's syndrome, CD and hemolytic anemia has also been reported^{12,13}. Moreover, autoimmune thyroiditis has been associated with other skin disorders. Noso et al reported an association of thyroid autoimmunity with alopecia areata, an autoimmune disease directed to hair follicles. The authors found a positive association of DRB1*15:01-DQB1*06:02 with alopecia areata in TSH (thyrotropin) receptor antibody-positive patients indicating that this haplotype confers susceptibility to thyroid autoimmunity, suggesting a common etiology and susceptibility between autoimmune thyroiditis and alopecia areata¹⁴.

In addition, a recent cross-sectional study on 1,000 patients with vitiligo reported a significantly higher prevalence of thyroid disease in the vitiligo population than in the US general population¹⁵.

Finally, three cases of coexistence for hidradenitis suppurativa (HS) with Hashimoto's thyroiditis are recently reported, supporting the hypothesis for dysregulation of the immune system's function in the pathogenesis of HS¹⁶.

Evidence for a genetic contribution to an association for psoriasis and HT also includes increased concordance rates in monozygotic twins¹⁷.

Moreover, studies have aimed to identify the genetic polymorphisms involved in the pathogenesis of psoriasis. Particularly, the cytotoxic T-lymphocyte regulatory gene (CTLA4) single nucleotide polymorphism (SNP) at position 49 in exon 1 has been linked to both psoriasis and Hashimoto's thyroiditis^{18; 19}.

Limited information is available regarding the HLA haplotype connection between psoriasis and Hashimoto's thyroiditis. Neither HLA-C nor HLA-B*27 alleles have been implicated in

the development of Hashimoto thyroiditis²⁰, thus, evidence regarding an HLA link for psoriasis with HT has not been fully elucidated.

Of note, a study investigating thyroid abnormalities in psoriatic patients reported an association between the clinical characteristics of psoriasis and thyroid function as well elevated thyroid hormone levels and increased anti-TPO levels in individuals with psoriasis, suggesting that thyroid hormones may trigger increased epidermal growth factor production, important for keratinocyte proliferation and relevant to the clinical manifestation of psoriasis²¹.

Support for the postulated increased prevalence of psoriasis in persons with HT is evident in our study population because HT was highly associated with psoriasis, even when adjusted for gender, age, psoriatic arthropathy and systemic anti-psoriatic agents. As expected, in our study population, HT prevalence was higher in women than men, and as expected, psoriasis had equal gender prevalence (1% for both). Furthermore, since IL-23 and Th17 levels are increased in psoriasis, as well as in HT, a possible link exists for the involvement of these two cytokines in the pathogenesis of both disorders^{22; 23}.

The detection of a significant association between psoriasis and HT, even when adjusted for systemic anti-psoriatic therapy (both biological and non-biological agents), is particularly notable because such agents play an immunomodulatory role and perhaps may affect the pathogenesis of immune mediated disorders such as HT. We also adjusted for psoriatic arthritis in our study population, a condition that has been reported to be associated with thyroid immune disorders²⁴, and even with this adjustment, psoriasis remained significantly associated with HT, lending even stronger support for the apparent association between these two disorders.

Although psoriasis clinical severity was not assessed in this study, systemic treatment might be used as an approximate, and relative, indicator of disease severity. The significant association detected after adjustment for exposure to systemic therapy, suggests that this association may not be related to psoriasis severity. However, further studies are warranted to confirm an association relative to psoriasis severity grades.

Limitations of this study are related to the inability to verify diagnostic coding and drug exposure beyond what is recorded in an EMR. The medical record documentation processes invokes confounding factors such as unpredictable, subsequent recoding of diagnoses, subsequent changes to type of clinic encounter, and in some cases, adjustment to demographic data such as age and race, all which might lead to change in dataset. In addition, it is important to note that the frequency and prevalence of autoimmune diseases have been reported to differ geographically from country to country.²⁵ Finally, psoriasis clinical severity was not assessed, thus a stratified analyses by psoriasis severity grade was not conducted.

Notably, these findings in our population show a high association between HT and psoriasis, even in the male population, making this association especially important considering that the prevalence of autoimmune thyroiditis is generally viewed to be underestimated for men compared to women. Because these findings have such broad clinical impact in both

medicine and dermatology, these new findings for this association deserves prioritized attention in patient care and clinical research, including the arena of developmental of therapeutics.

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References

1. Parisi R, Symmons DP, Griffiths CE, et al. Global epidemiology of psoriasis: a systematic review of incidence and prevalence. *J Invest Dermatol.* 2013; 133:377–385. [PubMed: 23014338]
2. Szramka-Pawlak B, Hornowska E, Walkowiak H, et al. Hope as a Psychological Factor Affecting Quality of Life in Patients With Psoriasis. *Appl Res Qual Life.* 2014; 9:273–283. [PubMed: 24834136]
3. Augustin M, Reich K, Glaeske G, et al. Co-morbidity and age-related prevalence of psoriasis: Analysis of health insurance data in Germany. *Acta Derm Venereol.* 2010; 90:147–151. [PubMed: 20169297]
4. Yeung H, Takeshita J, Mehta NN, et al. Psoriasis severity and the prevalence of major medical comorbidity: a population-based study. *JAMA Dermatol.* 2013; 149:1173–1179. [PubMed: 23925466]
5. Ali FR, Warren RB. Psoriasis and susceptibility to other autoimmune diseases: an outline for the clinician. *Expert Rev Clin Immunol.* 2013; 9:99–101. [PubMed: 23390938]
6. Caturegli P, De Remigis A, Rose NR. Hashimoto thyroiditis: clinical and diagnostic criteria. *Autoimmun Rev.* 2014; 13:391–397. [PubMed: 24434360]
7. Chistiakov DA. Immunogenetics of Hashimoto's thyroiditis. *J Autoimmune Dis.* 2005; 2:1. [PubMed: 15762980]
8. Ahmed R, Al-Shaikh S, Akhtar M. Hashimoto thyroiditis: a century later. *Adv Anat Pathol.* 2012; 19:181–186. [PubMed: 22498583]
9. Fairweather D, Frisancho-Kiss S, Rose NR. Sex differences in autoimmune disease from a pathological perspective. *Am J Pathol.* 2008; 173:600–609. [PubMed: 18688037]
10. Ishak RS, Piliang MP. Association between alopecia areata, psoriasis vulgaris, thyroid disease, and metabolic syndrome. *J Investig Dermatol Symp Proc.* 2013; 16:S56–57.
11. Birkenfeld S, Dreiherr J, Weitzman D, et al. Coeliac disease associated with psoriasis. *Br J Dermatol.* 2009; 161:1331–1334. [PubMed: 19785615]
12. Wu JJ, Nguyen TU, Poon KY, et al. The association of psoriasis with autoimmune diseases. *J Am Acad Dermatol.* 2012; 67:924–930. [PubMed: 22664308]
13. Hsu LN, Armstrong AW. Psoriasis and autoimmune disorders: a review of the literature. *J Am Acad Dermatol.* 2012; 67:1076–1079. [PubMed: 23062896]
14. Noso S, Park C, Babaya N, et al. Organ specificity in autoimmune diseases: thyroid and islet autoimmunity in alopecia areata. *J Clin Endocrinol Metab.* 2015; 100:1976–1983. [PubMed: 25734250]
15. Gill L, Zarbo A, Isedeh P, et al. Comorbid autoimmune diseases in patients with vitiligo: A cross-sectional study. *J Am Acad Dermatol.* 2016; 74:295–302. [PubMed: 26518171]
16. Gonzalez-Lopez MA, Blanco R, Mata C, et al. Coexistence of Hidradenitis Suppurativa with Autoimmune Thyroiditis: Report of Three Cases. *Dermatology.* 2016; 232:162–164. [PubMed: 26444851]

17. Hemminki K, Li X, Sundquist K, et al. Familial association of inflammatory bowel diseases with other autoimmune and related diseases. *Am J Gastroenterol.* 2010; 105:139–147. [PubMed: 19707191]
18. Benhatchi K, Jochmanova I, Habalova V, et al. CTLA4 exon1 A49G polymorphism in Slovak patients with rheumatoid arthritis and Hashimoto thyroiditis-results and the review of the literature. *Clin Rheumatol.* 2011; 30:1319–1324. [PubMed: 21503616]
19. Muto M, Deguchi H, Tanaka A, et al. Association between T-lymphocyte regulatory gene CTLA4 single nucleotide polymorphism at position 49 in exon 1 and HLA-DRB1*08 in Japanese patients with psoriasis vulgaris. *J Dermatol Sci.* 2011; 62:70–71. [PubMed: 21316924]
20. Ueda S, Oryoji D, Yamamoto K, et al. Identification of independent susceptible and protective HLA alleles in Japanese autoimmune thyroid disease and their epistasis. *J Clin Endocrinol Metab.* 2014; 99:E379–383. [PubMed: 24285682]
21. Zoabi A, Ziv M, Rozenman D, et al. Prevalence of thyroid abnormalities among psoriatic patients. *Harefuah.* 2012; 151:566–569. 605–566. [PubMed: 23316662]
22. Shabgah AG, Fattahi E, Shahneh FZ. Interleukin-17 in human inflammatory diseases. *Postepy Dermatol Alergol.* 2014; 31:256–261. [PubMed: 25254011]
23. Bossowski A, Moniuszko M, Idzkowska E, et al. Evaluation of CD4+CD161+CD196+ and CD4+IL-17+ Th17 cells in the peripheral blood of young patients with Hashimoto's thyroiditis and Graves' disease. *Pediatr Endocrinol Diabetes Metab.* 2012; 18:89–95. [PubMed: 23146786]
24. Antonelli A, Delle Sedie A, Fallahi P, et al. High prevalence of thyroid autoimmunity and hypothyroidism in patients with psoriatic arthritis. *J Rheumatol.* 2006; 33:2026–2028. [PubMed: 17014017]
25. Youinou P, Pers JO, Gershwin ME, et al. Geo-epidemiology and autoimmunity. *J Autoimmun.* 2010; 34:J163–167. [PubMed: 20056534]