**Table I.** Cont'd

| | Time, weeks | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Active treatment (until week 24) | | | | | | Follow-up | Observation at week 24 compared with baseline | Observation during follow-up |
| A-15 | | | | | | | | Underlying AGA; low response | |
| Regrowth (%) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.3 | | | |
| SALT (%) | 32 | 32 | 32 | 32 | 32 | 30 | | | |

A SALT score of 100% indicates complete hair loss.
*AA*, Alopecia areata; *AGA*, androgenetic alopecia; *SALT*, Severity of Alopecia Tool.
*Patient with alopecia totalis or alopecia universalis.

Among the patients whose SALT scores were available beyond 24 weeks, 3 continued to exhibited improved hair growth 12 weeks after treatment had stopped (A-01, A-06, and A-10 at week 36; Supplemental Fig S2). Although our study was limited by the small cohort size and potential for spontaneous improvement of AA, this is unlikely because of the long disease history in patient A-01. The robust and safe durable response observed in this patient in this study suggests that abatacept may be useful for a subset of patients with AA as a single agent or potentially as a part of combination regimens. Innovative approaches that potentially use Janus kinase inhibitors[4] initially to induce remission and abatacept to maintain or deepen these responses could be envisioned as one sequential strategy.

*Julian Mackay-Wiggan, MD,[a] Brigitte N. Sallee, MD,[a] Eddy Hsi Chun Wang, PhD,[a] Freda Sansaricq, MD,[a] Nhan Nguyen, MD,[a] Carey Kim, MD,[a] James C. Chen, PhD,[a] Angela M. Christiano, PhD,[a,b] and Raphael Clynes, MD, PhD[a]*

*From the Departments of Dermatology[a] and Genetics and Development,[b] Columbia University, New York, New York.*

*Dr Mackay-Wiggan is currently affiliated with the Siperstein Dermatology Group, Boca Raton, Florida. Dr Sallee is currently affiliated with the Department of Dermatology, University of Oklahoma College of Medicine, Oklahoma City, Oklahoma. Dr Sansaricq is currently affiliated with the Department of Internal Medicine, North Shore University Hospital, Manhasset, New York. Dr Nguyen is currently affiliated with the Schweiger Dermatology Group, New York, New York. Dr Kim is currently affiliated with the Department of Dermatology, New York Medical College, New York, New York. Dr Clynes is currently affiliated with Xencor Inc, Monrovia, California.*

*Funding sources: Supported by Locks of Love Foundation and National Institute of Arthritis and Musculoskeletal and Skin Diseases grants R21AR061881, U01AR067173, K08AR069111, and P50AR070588). Study drug was provided by Bristol Myers Squibb.*

*Conflicts of interest: None declared.*

*IRB approval status: Approved by Columbia University IRB-AAAK2167.*

*Correspondence to: Angela M. Christiano, PhD, Department of Dermatology, Columbia University, Russ Berrie Medical Science Pavilion, 1150 St Nicholas Ave, Rm 307, New York, NY 10032*

*E-mail: amc65@columbia.edu*

**REFERENCES**

1. Petukhova L, Duvic M, Hordinsky M, et al. Genome-wide association study in alopecia areata implicates both innate and adaptive immunity. *Nature*. 2010;466:113-117.
2. Kremer JM, Westhovens R, Leon M, et al. Treatment of rheumatoid arthritis by selective inhibition of T-cell activation with fusion protein CTLA4Ig. *N Engl J Med*. 2003;349:1907-1915.
3. Olsen EA, Canfield D. SALT II: a new take on the Severity of Alopecia Tool (SALT) for determining percentage scalp hair loss. *J Am Acad Dermatol*. 2016;75:1268-1270.
4. Xing L, Dai Z, Jabbari A, et al. Alopecia areata is driven by cytotoxic T lymphocytes and is reversed by JAK inhibition. *Nat Med*. 2014;20:1043-1049.

https://doi.org/10.1016/j.jaad.2020.09.091

## Hidradenitis suppurativa and major adverse cardiac events: A systematic review and meta-analysis

*To the Editor:* Hidradenitis suppurativa (HS) is a chronic inflammatory disorder that results in significant morbidity. There is conflicting evidence on whether HS is associated with major adverse cardiac events (MACEs), including cerebrovascular

**Table I.** Characteristics of included studies*

| Study year | Country | Study type (data range in years) | Ethnicity | Data source | Number of patients with and without HS | Outcomes of interest (effect size, 95% confidence interval) | Adjusted confounders | Risk of bias† |
|---|---|---|---|---|---|---|---|---|
| 2020 | Denmark | Cohort (1994-2018) | NR | Danish National Patient Registry | 14,488 with HS, NR without HS | Acute MI (RR, 1.37; 1.35-1.39; $P < .001$) | Matched for sex, type of hospital encounter, discharge week, and birth decade | Good |
| 2016 | Denmark | Cohort (1997-2011) | White | Individual-level linkage of nationwide administrative registers | 5964 with HS, 29,404 without HS | Ischemic stroke (IRR, 1.33; 1.01-1.76; $P = .03$)<br>MI (IRR, 1.57; 1.14-2.17; $P = .005$)<br>CV-associated death (IR, 1.95; 1.42-2.67; $P < .001$) | Age, sex, socioeconomic status, smoking, comorbidity, and medication | Good |
| 2019 | Taiwan | Cohort (2000-2013) | Asian | Taiwan National Health Insurance Research Database | 478 with HS, 1912 without HS | Cerebral infarction (HR, 0.51; 0.12-2.23; $P = .375$) | Sex, age, comorbidity (CCI-R scores), alcoholism, obesity, and residence/regions | Good |
| 2020 | United States | Cohort (1999-2019) | White (59.6%), African American (32.7%), Other (7.7%) | Multi—health system data analytics and research platform (Explorys) | 49,862 with HS, 1,421,223 without HS | CVA (HR, 1.22; 1.14-1.31; $P < .001$)<br>MI (HR, 1.21; 1.12-1.32; $P < .001$) | Age, sex, race, smoking status, body mass index, hypertension, hyperlipidemia, type 2 diabetes, Charlson comorbidity index score, and cardiovascular medications | Good |
| 2017 | United States | Case-control (2002-2012) | NR | National Inpatient Sample | 6872 discharges with HS, NR without HS | CVA (OR, 0.02, 0.01-0.09; $P < .001$)<br>MI (OR, 0.36; 0.28-0.45; $P < .001$) | Propensity score matched for age, sex, race/ethnicity, household income, insurance status, number of chronic conditions, and hospital region | Poor |

Continued

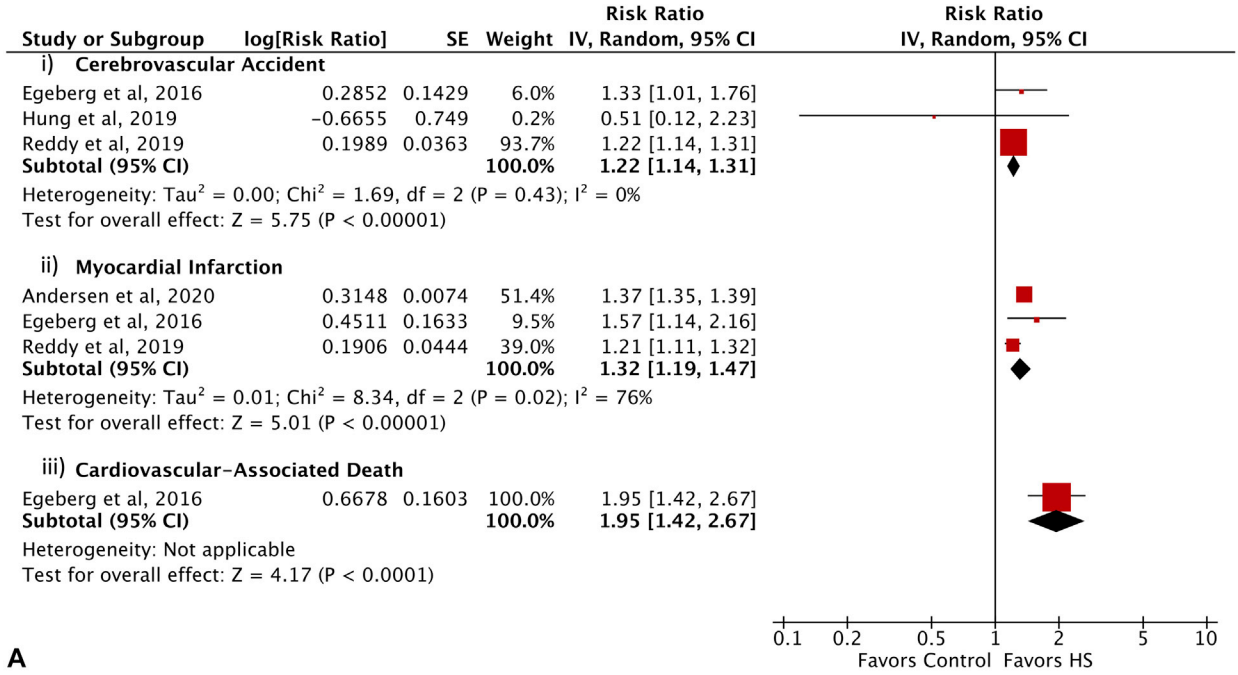
**Table I.** Cont'd

| Study year | Country | Study type (data range in years) | Ethnicity | Data source | Number of patients with and without HS | Outcomes of interest (effect size, 95% confidence interval) | Adjusted confounders | Risk of bias[†] |
|---|---|---|---|---|---|---|---|---|
| 2018 | Denmark | Case-control (NR) | White | A general suburban population study (GESUS) | 430 with HS, 20,780 without HS | Stroke, NR (found to be nonsignificant)<br>MI (OR, 2.11; 1.09- 4.10, $P = .027$) | Age, sex, smoking, metabolic syndrome | Fair |
| 2020 | Germany | Case-control (NR) | NR | Health insurance (InGef) research database | NR | Stroke (OR, 1.07; 0.76-1.51; $P < .001$) | Matched for age and sex | Good |
| 2019 | United States | Case-control (NR) | NR | Chart review (Duke University Medical Center) | 5046 with HS, 25,827 without HS | Stroke (OR, 1.73; 1.37-2.21; $P < .001$)<br>Acute MI (OR, 1.07; 0.76-1.51; $P = .70$) | Age, sex, race, smoking status, and socioeconomic status; cardiovascular comorbidities (obesity, hypertension, hyperlipidemia, renal disease, venous thromboembolism, metabolic syndrome, and diabetes), 1:3 matching on age, sex, race, and follow-up time | Good |

*CCI-R*, Charlson Comorbidity Index - Revised; *CV*, cardiovascular; *CVA*, Cerebrovascular accident; *HR*, hazard ratio; *HS*, hidradenitis suppurativa; *IRR*, incident rate ratio; *MI*, myocardial infarction; *NR*, not reported; *OR*, odds ratio; *RR*, relative risk; *InGef*, Institut für angewandte Versorgungsforschung Berlin GmbH.

*Please contact the corresponding author for additional information.

[†]According to the Newcastle-Ottawa scale.



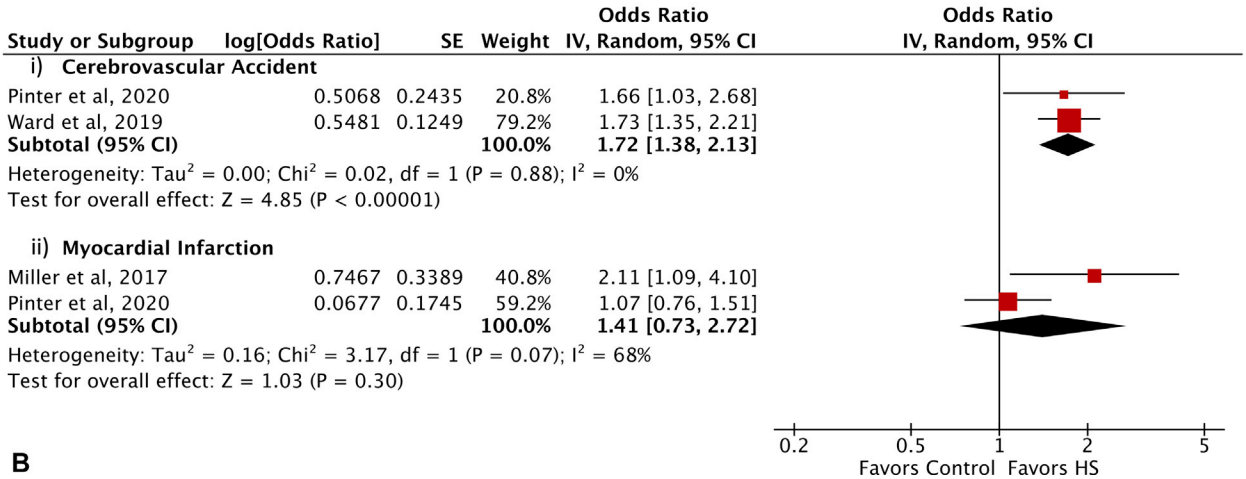




**Fig 1.** **A**, Forest plot showing the pooled risk ratio and (**B**) forest plot showing the pooled odds ratios of major adverse cardiac events in patients with hidradenitis suppurativa (HS) compared to the general population. *CI*, Confidence interval; *df*, degrees of freedom; *IV*, independent variable; *SE*, standard error.

accident (CVA), myocardial infarction (MI), and cardiovascular-associated mortality.[1,2] Here, we aim to resolve these discrepancies through a systematic review and meta-analysis of the literature.

Our study protocol was preregistered on PROSPERO (CRD42020181076). MEDLINE and Embase were searched from inception to July 15, 2020, using keywords "hidradenitis," "infarction," and "cerebrovascular." Of 184 records, 4 cohort and 4 case-control studies were included (Supplemental Fig 1; available via Mendeley at https://doi.org/10.17632/9x7dxmhfwc.1). According to the Newcastle-Ottawa scale, all studies were rated as having fair or good quality except for 1 study, which was excluded from our analysis because this study likely underreported cardiovascular and dermatologic comorbidities (Table I).

Patients with HS had increased risk of CVA risk ratio (RR), 1.22; 95% confidence interval [CI], 1.14-1.31) in the pooled analysis of cohort studies and increased odds of CVA (odds ratio, 1.72; 95% CI, 1.38-2.13) among case-control studies (Fig 1).

Patients with HS had increased risk of MI ($P < .001$) in the pooled analysis of cohort studies. The magnitude of increased risk could not be determined because of study heterogeneity ($I^2 = 76\%$). This may be due to population differences between a US study reporting a smaller RR and 2 Danish studies reporting larger RRs. Additionally, the US study adjusted for the most confounders and cardiovascular comorbidities and uniquely accounted for ethnicity, which likely contributed to different MI risk across studies.

Among case-control studies, there were conflicting results regarding the association of MI and HS: 1 study reported increased odds, whereas another study reported no association. This discrepancy may be due to survival bias inherent in case-control designs, especially considering the increased odds of all-cause mortality in patients with HS.[3] Finally, different populations, adjusted confounders, and definitions of MACEs (eg, *acute MI* defined as International Classification of Diseases (ICD)−10th Revision code I21 in one cohort study vs *MI* defined as ICD−Ninth Revision code 410.x or ICD−10th Revision code I21.x-I22.x in another cohort study) likely contributed to differing magnitudes of association.

One study reported increased risk of cardiovascular-associated mortality in patients with HS (RR, 1.95; 95% CI, 1.42-2.67). Furthermore, 1 cohort and 1 case-control study found that the association between HS and MACEs may be independent of disease severity. Additional studies are needed because these findings either relied on patient-reported severity or involved a small study population.

The association between HS and MACE is hypothesized to result from chronic systemic inflammation. Patients with HS have decreased levels of circulating endothelial progenitor cells,[4] which function to protect the vascular endothelium, and elevated levels of proinflammatory cytokines (interleukin 1$\beta$, interleukin 6, interleukin 23, and tumor necrosis factor alpha), which promote atherosclerosis and thrombosis.[1] Effective interventions for HS may reduce the risk of MACEs.

In conclusion, patients with HS should be informed of their increased risk of MACEs. Because of the suboptimal screening for cardiovascular comorbidities in patients with HS,[5] early screening and appropriate counseling on modifiable cardiac risk factors should be provided for all patients with HS, and appropriate cardiac workup should be considered in those presenting with cardiac symptoms.

*Adrian Michel Joseph Bailey, BSc,*[a] *Heidi Oi-Yee Li, BSc,*[a] *Marcus G. Tan, MD,*[a,b] *and Mark G. Kirchhof, MD, PhD, FRCPC*[a,b]

*From the Faculty of Medicine, University of Ottawa, Ottawa, Ontario, Canada*[a]*; and the Division of Dermatology, The Ottawa Hospital, Ottawa, Ontario, Canada.*[b]

*Authors Bailey and Li and Dr Tan are co-first authors.*

*Funding sources: None.*

*Conflicts of interest: None disclosed.*

*IRB approval status: Not applicable.*

*Reprints not available from the authors.*

*Correspondence to: Mark G. Kirchhof, MD, PhD, FRCPC, The Ottawa Hospital, Division of Dermatology, 737 Parkdale Ave, 4th Floor, Dermatology, Ottawa, Ontario, K1Y 1J8, Canada*

*E-mail: mkirchho@uottawa.ca*

**REFERENCES**

1. Hung C-T, Chiang C-P, Chung C-H, Tsao C-H, Chien W-C, Wang W-M. Increased risk of cardiovascular comorbidities in hidradenitis suppurativa: a nationwide, population-based, cohort study in Taiwan. *J Dermatol*. 2019;46(10):867-873.
2. Kwa MC, Silverberg JI. Association between inflammatory skin disease and cardiovascular and cerebrovascular co-morbidities in US adults: analysis of Nationwide Inpatient Sample data. *Am J Clin Dermatol*. 2017;18(6):813-823.
3. Reddy S, Strunk A, Garg A. All-cause mortality among patients with hidradenitis suppurativa: a population-based cohort study in the United States. *J Am Acad Dermatol*. 2019;81(4):937-942.
4. Matusiak Ł, Batycka-Baran A, Bieniek A, Szepietowski JC. Decreased number of circulating endothelial progenitor cells in hidradenitis suppurativa patients. *Dermatology*. 2015;230(3):228-233.
5. Singh P, Silverberg JI. Screening for cardiovascular comorbidity in United States outpatients with psoriasis, hidradenitis, and atopic dermatitis. *Arch Dermatol Res*. 2020. https://doi.org/10.1007/s00403-020-02087-w.

https://doi.org/10.1016/j.jaad.2020.10.005

## Trends in Medicare Part D prescription claims for biologic and nonbiologic immunosuppressive medications by dermatologists

*To the Editor:* Biologic immunomodulators are increasingly used to treat many inflammatory skin conditions, given their targeted mechanisms and lower immunosuppressive effects compared with traditional agents.[1] We sought to compare recent use trends in novel biologic and traditional nonbiologic