HHS Public Access

Author manuscript

J Eur Acad Dermatol Venereol. Author manuscript; available in PMC 2021 October 01.

Published in final edited form as:

J Eur Acad Dermatol Venereol. 2020 October ; 34(10): e606–e608. doi:10.1111/jdv.16486.

A Retrospective Study of Myocardial Abnormalities Detected on Cardiac Magnetic Resonance Imaging Among Patients with Psoriasis Compared to Inflammatory Skin Disease Controls

Michael Goldenberg, BS[†1], **Matthew Reynolds, MD**[2], **Suzanne Smart, BE**[3], **Jessica Kaffenberger, MD**[4], **Subha Raman, MD**[5], **Benjamin H. Kaffenberger, MD**[6]

[1†]Medical Student Research Program, The OSU College of Medicine, the OSU Heart and Lung Research Institute, The Ohio State University Wexner Medical Center, Columbus, OH

[2]The OSU College of Medicine, the OSU Heart and Lung Research Institute, The Ohio State University Wexner Medical Center, Columbus, OH

[3]Department of Internal Medicine, Division of Cardiology, The Ohio State University Wexner Medical Center

[4]Department of Internal Medicine, Division of Dermatology, The Ohio State University Wexner Medical Center

[5]Department of Internal Medicine, Division of Cardiology, The Ohio State University Wexner Medical Center

[6]Department of Internal Medicine, Division of Dermatology, The Ohio State University Wexner Medical Center

To the Editor:

Cardiac magnetic resonance (CMR) has established utility in demonstrating myocardial inflammation with a high sensitivity and specificity consistent with myocardial biopsies.[1] Cardiovascular disease in psoriasis has been previously studied using techniques such as positron-emission tomography (PET) and cardiac computed tomography (cCT).[2] Ionizing radiation makes these less-appealing modalities, particularly in younger patients and for repeated measures. Our goal was to determine if myocardial edema and inflammation are differentially increased in psoriasis patients, consistent with what has been detected in patients with myocarditis and systemic lupus erythematosus using techniques previously described.[3]

Corresponding Author: Michael Goldenberg BS, 1328 Dublin Road, Suite 100, Columbus, OH 43215, michael.goldenberg@osumc.edu.

IRB Approval Status: This work was reviewed and approved by the Biomedical Sciences Institutional Review Board of The Ohio State University Wexner Medical Center with The Ohio State University's OHRP Federalwide Assurance #00006378

Conflicts of Interest: BHK is an investigator for Biogen, Celgene, Eli Lilly Co, Veloce Biopharmaceuticals, and XBiotech, and he has received grants not related to this work from the Dermatology Foundation and the Rosacea Society. JK is an investigator for Jannsen, Novartis, Abbvie, AnaptysBio, Bristol-Myers, Celgene, Regeneron, Corrona, Eli Lilly Co, Pfizer, and XBiotech. The other investigators do not have conflicts of interest to disclose.

This study identified 47 patients diagnosed with psoriasis and 159 controls (125 with atopic dermatitis and 34 with rosacea) who had undergone CMR between 2011 and 2018. CMR data including quantitative T1 mapping with estimates of myocardial extracellular volume fraction (ECV) evaluating edema/interstitial space, T2 mapping to detect inflammation/edema,[3] and late gadolinium enhancement for myocardial fibrosis were evaluated.

Psoriasis and control patients were generally well-matched in demographic features and cardiac risk factors, although psoriasis patients were more likely to be men (55% versus 32%, p=0.0057) and to have a higher BMI (31.1 versus 28.7, p=0.032) (Table 1). After analyzing the univariate outcomes from the cardiac data (table 2), a multivariate analysis was run (data not shown). When controlling for sex and BMI, T2 imaging still showed that psoriasis patients had more abnormalities in the septum wall, which is indicative of inflammation and edema (p = 0.0483).

This data provides insight into cardiac issues faced by psoriasis patients. Previously, it has been shown that psoriasis patients have increased rates of vascular events and increased numbers of inflammatory markers, including Th1, Th17, interleukin-8, homocysteine, and others.[4] Furthermore, patients given systemic anti-inflammatory medications have been shown to have fewer vascular events, further substantiating evidence for systemic inflammatory-driven mechanisms in psoriasis.[4] The presence of inflammation and edema corresponds with greater relaxation times on T2 imaging, which can accurately detect not only acute inflammation, but also subacute inflammation seen in systemic inflammatory conditions, including rheumatoid arthritis, lupus erythematosus, and others.[5] The psoriasis patients in this study showed increased edema and inflammation by T2 mapping of the septal wall. Our study has multiple limitations, most prominently a small sample of active psoriasis patients, who were likely to be heavier men. Further, all patients underwent CMR for cardiac symptoms and it is unclear if the results would generalize to patients without symptoms. A strength of this study is that all of the CMRs were conducted at The Ohio State University Wexner Medical Center, which limited potential differences that could have arisen with a multicenter study. CMR may potentially offer a valuable non-ionizing imaging biomarker for cardiac disease in psoriasis patients. Further analyses and prospective CMR mapping in greater numbers of psoriasis patients is necessary to determine the prevalence and prognostic significance of these abnormalities.

Funding Sources:

This work was supported in part by the OSU College of Medicine Roessler research scholarship (MG).

The project described was supported by Award Number Grant UL1TR002733 from the National Center For Advancing Translational Sciences. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Center For Advancing Translational Sciences or the National Institutes of Health.

Abbreviation List

CMR	Cardiac magnetic resonance imaging
cCT	Cardiac computed tomagraphy

PET	Positron emission tomography
LGE	Late gadolinium enhancement
ECV	Extracellular volume fraction

References

1. Biesbroek PS, Beek AM, Germans T, Niessen HWM, Van Rossum AC. Diagnosis of myocarditis: Current state and future perspectives. Int J Cardiol. Elsevier Ireland Ltd; 2015;191:211–9.
2. Noe MH, Wan MT, Shin DB, Armstrong AW, Duffin KC, Chiesa Fuxench ZC,Kalb RE, Menter A, Simpson EL, Takeshita J, Tyring SK, Van Voorhees AS, Mehta NN, Gelfand JM, Patient-Reported Outcomes of Adalimumab, Phototherapy, and Placebo in the Vascular Inflammation in Psoriasis Trial: A Randomized Controlled Study. Journal of the American Academy of Dermatology; 2019;S0190–9622(19)30884–9.
3. Thavendiranathan P, Walls M, Giri S, Verhaert D, Rajagopalan S, Moore S, et al. Improved detection of myocardial involvement in acute inflammatory cardiomyopathies using T2 mapping. Circ Cardiovasc Imaging. 2012;5(1):102–10. [PubMed: 22038988]
4. Hu SC, Lan CE. Psoriasis and Cardiovascular Comorbidities: Focusing on Severe Vascular Events, Cardiovascular Risk Factors and Implications for Treatment. Int J Mol Sci. 2017;18(10):2211.
5. Messroghli DR, Moon JC, Ferreira VM, et al. Clinical recommendations for cardiovascular magnetic resonance mapping of T1, T2, T2* and extracellular volume: A consensus statement by the Society for Cardiovascular Magnetic Resonance (SCMR) endorsed by the European Association for Cardiovascular Imaging (EACVI) [published correction appears in J Cardiovasc Magn Reson. 2018 Feb 7;20(1):9]. J Cardiovasc Magn Reson. 2017;19(1):75. [PubMed: 28992817]

Table 1

: Demographic features of patients with psoriasis versus atopic dermatitis and rosacea controls.

Variable	Psoriasis (n=47)	Controls (n=159) (Rosacea + Atopic Dermatitis)	P-value
Age at MRI	52.5 ± 16.7	51.3 ± 15.2	0.328 (Prob > t)
Men	26 (55%)	51 (32%)	0.0057
Body Mass index	31.12 ± 7.54	28.71 ± 6.86	0.0320 (Prob > t)
Top Indications for cMR	Cardiomyopathy (6) (13%)	Cardiomyopathy (21) (13%)	
	Chest Pain (4) (9%)	Chest Pain (19) (12%)	
	Evaluate a Mass (3) (6%)	Left Ventricular Dysfunction (10) (6%)	
	Ventricular Arrhythmia (3) (6%)		
Average Body Surface Area Affected at time of MRI	7.2% ± 13.8	--	
Systemic Therapy Used	10* (21%)	--	

*Methotrexate = 5, *Acitretin = 2, *Light Therapy = 2, *Adalimumab = 1, *Infliximab = 1

Continuous variables analyzed by t-testing and values represent mean ± standard deviation, categorical variables by χ^2 testing.

Table 2:

Cardiac parameters detected by CMR between psoriasis and controls.

Variable	Psoriasis (n=47)	Controls (n=159) (Rosacea + Atopic Dermatitis)	P-value
Total Positive LGE	23 (50%)	45 (29%)	0.0122
ECV Septal (%) Recentered (25)	4 ± 7.34	0.365 ± 5.07	0.02
ECV Lateral (%) Recentered (25)	1.14 ± 6.14	−0.47 ± 5.3	0.14
Abnormal T2 septal (normal: 52.18 ± 3.4)	18 (60%)	28 (34%)	0.0168
Abnormal T2 lateral (normal: 52.18 ± 3.4)	14 (48%)	45 (54%)	0.6675
Abnormal EF (<55%)	14 (30%)	33 (21%)	0.2355
Abnormal MRI (any finding)	34 (72%)	86 (54%)	0.0291

Hematocrit reported for normalization of extracellular fracture volume. Late gadolinium enhancement differences were not detected in terms of absolute occurrence or by coronary artery distribution. Continuous variables analyzed by t-testing and values represent mean ± standard deviation, categorical variables by χ^2 testing.