The Journal of Rheumatology 2022;49:1020–5
doi:10.3899/jrheum.211231
First Release July 15 2022

The Journal of Rheumatology

Effectiveness of Disease-Modifying Antirheumatic Drugs for Enthesitis in a Prospective Longitudinal Psoriatic Arthritis Cohort

Ashish J. Mathew[1], Mitchell Sutton[2], Daniel Pereira[2], Dafna D. Gladman[3], and Vinod Chandran[4]

ABSTRACT. ***Objective.*** Our objective was to assess the effectiveness of conventional and targeted disease-modifying antirheumatic drugs (cDMARDs and tDMARDs, respectively) in treating enthesitis in psoriatic arthritis (PsA).

Methods. Patients with active enthesitis, defined as ≥ 1 tender entheses (of the 29 enthesis sites included in the Spondyloarthritis Research Consortium of Canada Enthesitis Index, the Leeds Enthesitis Index, and the Maastricht Ankylosing Spondylitis Enthesitis Score), who were enrolled in a large PsA cohort were included. Medications at baseline were classified into 3 mutually exclusive categories: (1) no treatment or nonsteroidal antiinflammatory drugs (NSAIDs) only; (2) cDMARDs ± NSAIDs; and (3) tDMARDs ± cDMARDs/NSAIDs. Complete resolution of enthesitis (no tender enthesis) at 12 months was the primary outcome. Logistic regression models were developed to determine the association between medication category and enthesitis resolution.

Results. Of the 1270 patients studied, 628 (49.44%) had enthesitis. Of these, 526 patients (51.71% males; mean [SD] age 49.02 [13.12] years; mean enthesitis score 2.13 [2.16]; median enthesitis score 2 [IQR 1-2]), with adequate follow-up were analyzed. Complete resolution of enthesitis was noted in 453 (86.12%) patients, within a mean period of 8.73 (3.48) months from baseline. In the regression analysis, though not significant, DMARDs (categories II and III) had higher odds ratios (ORs) compared to category 1 for resolution of enthesitis. Enthesitis resolution was associated with lower joint activity (OR 0.97, 95% CI 0.95-0.99; $P = 0.01$) and male sex (OR 1.66, 95% CI 0.97-2.84; $P = 0.06$).

Conclusion. Resolution of enthesitis was observed in 86% of patients in an observational setting regardless of the medication used. Future effectiveness studies may warrant evaluation of enthesitis using advanced imaging.

Key Indexing Terms: antirheumatic drugs, enthesopathy, psoriatic arthritis

Psoriatic arthritis (PsA), observed in approximately 25% of patients with psoriasis, is phenotypically heterogeneous, involving the skin, peripheral and axial joints, tendons, and entheses.[1,2] Its diverse clinical presentation and disease course translate to challenges in early diagnosis and therapeutic decision making.[3] Entheses are insertion sites of tendons, ligaments, fascia, or joint capsules to bone. Enthesitis—inflammation at the entheses—is perceived to play a crucial role in the pathogenesis of PsA and is described in 27% to 35% of patients with PsA in longitudinal observational cohorts.[4-6] The true prevalence

AJM was supported by the National Psoriasis Foundation Psoriatic Disease Research Fellowship. VC is supported by a Pfizer Chair Rheumatology Research Award from the Department of Medicine, University of Toronto. The University of Toronto Psoriatic Arthritis program is supported by the Krembil Foundation.

[1]A.J. Mathew, DNB, DM, Centre for Prognosis Studies in the Rheumatic Diseases, Psoriatic Arthritis Program, Schroeder Arthritis Institute, Krembil Research Institute, University Health Network, Toronto, Ontario, Canada, Division of Rheumatology, Department of Medicine, University of Toronto, Toronto, Ontario, Canada, The Copenhagen Center for Arthritis and Research (COPECARE), Center for Rheumatology and Spine Diseases, Centre of Head and Orthopedics, Copenhagen University Hospital - Rigshospitalet, Glostrup, Denmark, Department of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark, and Department of Clinical Immunology and Rheumatology, Christian Medical College, Vellore, India; [2]M. Sutton, MSc, D. Pereira, MSc, Centre for Prognosis Studies in the Rheumatic Diseases, Psoriatic Arthritis Program, Schroeder Arthritis Institute, Krembil Research Institute, University Health Network, Toronto, Ontario, Canada; [3]D.D. Gladman, MD, FRCPC, Centre for Prognosis Studies in the Rheumatic Diseases, Psoriatic Arthritis Program, Schroeder Arthritis Institute, Krembil Research Institute, University Health Network, Toronto, Division of Rheumatology, Department of Medicine, University of Toronto, and Institute of Medical Science, University of Toronto, Toronto, Ontario, Canada; [4]V. Chandran, DM, PhD, FRCPC, Centre for Prognosis Studies in the Rheumatic Diseases, Psoriatic Arthritis Program, Schroeder Arthritis Institute, Krembil Research Institute, University Health Network, Toronto, Division of Rheumatology, Department of Medicine, University of Toronto, Toronto, Institute of Medical Science, University of Toronto, Toronto, and Department of Laboratory Medicine and Pathobiology, University of Toronto, Toronto, Ontario, Canada.

The authors declare no conflicts of interest relevant to this article.

Address correspondence to Dr. V. Chandran, 1E416, Toronto Western Hospital, 399 Bathurst Street, Toronto, ON M5T 2S8, Canada. Email: vinod.chandran@uhnresearch.ca.

Accepted for publication May 17, 2022.

© 2022 The Journal of Rheumatology. This is an Open Access article, which permits use, distribution, and reproduction, without modification, provided the original article is correctly cited and is not used for commercial purposes.

Downloaded on October 7, 2026 from www.jrheum.org

of enthesitis may well be underestimated given the extent to which entheses go unassessed during clinical examination. The importance of this clinical domain in PsA is underscored by its inclusion in the stem of the Classification Criteria for Psoriatic Arthritis (CASPAR).[7] Enthesitis is associated with significant pain, physical dysfunction, less likelihood of achieving a state of minimal disease activity, reduced quality of life, and radiographic damage in patients with PsA.[5,8,9] Considering these significant consequences of enthesitis, it is important to investigate optimal therapeutic options for this domain.

Clinical assessment of enthesitis involves eliciting tenderness at the entheses described by validated clinical enthesitis indices, including the Spondyloarthritis Research Consortium of Canada (SPARCC) Enthesitis Index, Leeds Enthesitis Index (LEI), and Maastricht Ankylosing Spondylitis Enthesitis Score (MASES).[10] The Outcome Measures in Rheumatology endorses the assessment of enthesitis in all clinical trials and longitudinal observational studies of PsA.[11]

An array of conventional and targeted disease-modifying antirheumatic drugs (cDMARDs and tDMARDs, respectively) are currently available for the treatment of PsA. Recommendations for treatment of enthesitis have been emphasized in all the PsA treatment recommendations.[12,13] Further, the Group for Research and Assessment of Psoriasis and Psoriatic Arthritis provides treatment recommendations for individual domains, including enthesitis.[14] Recent clinical trials have determined the efficacy of tDMARDs on enthesitis in patients with PsA as secondary outcomes.[15] Nonetheless, similar evidence from observational studies is sparse. To bridge this gap, we aimed to study the effectiveness of cDMARDs and tDMARDs in the resolution of clinical enthesitis in an observational PsA cohort.

METHODS

Study design and setting. This is a retrospective analysis of prospectively collected data from the University of Toronto PsA clinic, which was established in 1978 to investigate the course and prognosis of patients with PsA.[16] Nearly all patients in this cohort satisfy the CASPAR criteria.[17] Patients are followed prospectively at 6-month intervals, or more often if closer monitoring is warranted owing to high disease activity or initiation of therapy.

Patients diagnosed as having PsA; attending the University of Toronto PsA clinic between January 1, 2000, and May 6, 2020; satisfying CASPAR criteria; and having active clinical enthesitis, defined as ≥ 1 tender enthesis of the 29 entheses included in the SPARCC, the LEI, and the MASES (Figure), were included.[10] We included patients from their clinic visit at which the detection of enthesitis was recorded for the first time (baseline), until its resolution within the subsequent 12 months. Medications prescribed as part of routine care at baseline determined the treatment group.

Variables and data measurement. A complete patient history including details of medications, followed by a comprehensive clinical assessment that includes body surface area of skin psoriasis and Psoriasis Area and Severity Index, Modified Nail Psoriasis Severity Index (mNAPSI), evaluation of joint inflammation (68 tender joints, 66 swollen joints), Bath Ankylosing Spondylitis Metrology Index, and chest expansion), joint damage (clinically damaged joints), assessment of dactylitis (Leeds Dactylitis Index), tenosynovitis, enthesitis (29 entheses: combination of MASES, LEI, and SPARCC), and presence of fibromyalgia (FM) are recorded and entered into an electronic platform. These assessments have been shown to be reliable.[18] Patient-reported outcomes including global assessment, Health Assessment Questionnaire (HAQ), 36-item Short Form Health Survey 36 (SF-36), and pain measured on a 0 to 10 scale are completed by the patients every 6 months (hard copies at the clinic, or electronic copies emailed prior to the appointment).[19]

The total number of involved entheses and actively inflamed joint count (sum of tender and/or swollen joints), along with other clinical domains (skin involvement, nail disease, axial disease, and dactylitis) as well as the presence of FM for each patient at the time of first documentation of enthesitis were noted. The medications prescribed at that particular clinic visit were categorized into 3 mutually exclusive ordinal groups. Category I included no treatment or NSAIDs only; category II included cDMARDs ± NSAIDs, but without tDMARDs (targeted biologic DMARDs and targeted synthetic DMARDs); and category III comprised tDMARDs with or without other medications. The primary outcome for analysis was defined as complete resolution of clinical enthesitis on these medications within 12 months of the baseline clinic visit. Patients who changed treatment after study entry were analyzed based on the treatment group that they were initially allotted to.

Statistical analysis. Categorical variables were expressed in numbers and percentages, and continuous variables were expressed as mean and SD. Univariable and multivariable logistic regression models were created to determine the association between medication category and complete resolution of enthesitis within 1 year after controlling for age, sex, BMI, duration of PsA, actively inflamed joint count at baseline, enthesitis score at baseline, nail disease, and FM. A P value ≤ 0.05 was considered as statistically significant. The results were expressed as odds ratio (OR) with 95% CI. The study was approved by the University Health Network Research Ethics Board (study no. 08-0630).

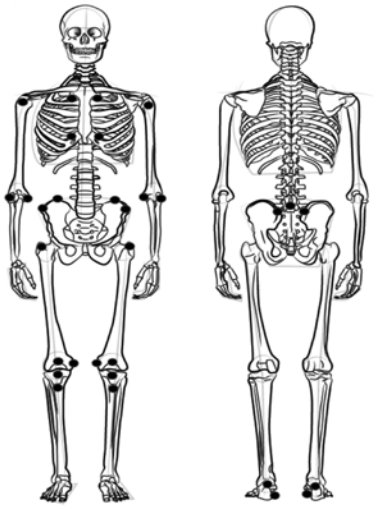
RESULTS

Baseline characteristics. During the study period of 20 years, 1270 unique patients with PsA attended the University of Toronto PsA clinic. Of these, 628 (49.44%) had enthesitis on ≥ 1 visit. Following exclusion of 102 patients from the cohort for suboptimal follow-up data, 526 patients (51.71% males) with a mean (SD) age of 49.02 (13.12) years were included. The median (IQR) and mean (SD) enthesitis score at baseline were 2 (1-2) and 2.13 (2.16), respectively. Demographic and disease characteristics at baseline are presented in Table 1.

Outcome. The number of patients in each medication category included 142 (27.00%) in category I, 196 (37.26%) in category II, and 188 (35.74%) in category III. Details regarding the number of patients on individual DMARDs and those with and without resolution of enthesitis in each category of medication is depicted in Table 2. The highest rate of resolution of enthesitis was noted in patients on cDMARDs (88.26%), followed by those on tDMARDs (86.70%). Complete resolution of enthesitis was observed in 453 (86.12%) patients, within a mean (SD) of 8.73 (3.48) months from initiation of therapy. In regression analysis, medication category was not associated with enthesitis resolution (global P value = 0.43 in multivariable analysis). Although nonsignificant, category II (OR 1.51, 95% CI 0.78-2.91; P = 0.30) and category III (OR 1.42, 95% CI 0.74-2.71; P = 0.22) demonstrated higher odds of enthesitis resolution compared to category I (Table 3).

Association of baseline characteristics with therapy. Univariate and multivariable regression models demonstrated an independent association of actively inflamed joint count at baseline with enthesitis response, with a higher joint activity reducing

Downloaded on October 7, 2026 from www.jrheum.org



1. Supraspinatus insertion (right and left)
2. 1st costochondral joints (right and left)
3. 7th costochondral joints (right and left)
4. Lateral epicondyle of humerus (right and left)
5. Medial epicondyle of humerus (right and left)
6. Anterior superior iliac spine (right and left)
7. Iliac crest (right and left)
8. Posterior superior iliac spine (right and left)
9. 5th lumbar spinous process
10. Greater trochanter (right and left)
11. Quadriceps insertion into superior border of patella (right and left)
12. Medial condyle of femur (right and left)
13. Patellar tendon insertion into a) inferior border of patella OR b) tibial tubercle * (right and left)
14. Achilles tendon insertion into calcaneum (right and left)
15. Plantar fascia insertion into calcaneum (right and left)

* In the SPARCC enthesitis index for scoring purposes, the inferior border of patella and tibial tubercle are considered as one site

Figure 1. Entheses (combination of SPARCC, LEI, and MASES) examined in the study. LEI: Leeds Enthesitis Index; MASES: Maastricht Ankylosing Spondylitis Enthesitis Score; SPARCC: Spondyloarthritis Research Consortium of Canada.

Table 1. Baseline characteristics of the study patients (N = 526).

	Values
Age, yrs	49.02 (13.12)
Males, n (%)	272 (51.71)
Duration of PsA, yrs	10.74 (10.73)
BMI, kg/m^2	29.13 (6.25)
PASI	4.26 (8.38)
Enthesitis score, median (IQR)	2 (1-2)
Time of enthesitis onset to resolution, months	8.73 (3.48)
Swollen joint count	3.30 (5.54)
Tender joint count	7.72 (9.83)
Actively inflamed joint count[a]	8.88 (10.55)
Damaged joint count	4.09 (8.38)
Axial disease[b], n (%) (N = 476)	141 (29.62)
Dactylitis, n (%)	108 (20.53)
Nail lesions at baseline, n (%)	287 (54.56)
Fibromyalgia at baseline, n (%)	127 (24.14)
Baseline enthesitis year, n (%)	
2000-2004	118 (22.43)
2005-2009	137 (26.05)
2010-2014	129 (24.52)
> 2015	142 (27.00)

Values are expressed as mean (SD) unless indicated otherwise. [a] Actively inflamed joint count is the sum of tender and/or swollen joints. [b] Axial disease was defined as patients fulfilling the radiographic arm of the modified New York ankylosing spondylitis criteria (≥ bilateral grade 2 sacroiliitis or unilateral grade 3 or 4). PASI: Psoriasis Area and Severity Index.

the odds of enthesitis resolution (OR 0.97, 95% CI 0.95-0.99; $P = 0.01$). A trend for higher response in males (OR 1.66, 95% CI 0.97-2.84; $P = 0.06$) was also noted (Table 3). Presence of FM did not demonstrate any association with enthesitis response.

DISCUSSION

This retrospective analysis of prospectively collected data from an established PsA cohort examined the effectiveness of DMARDs prescribed for overall PsA disease activity as part of routine care, in complete resolution of enthesitis. Nearly half of the patients in this cohort had clinical evidence of enthesitis that resolved in a very high proportion within a year of initiating therapy, regardless of the medications prescribed. Compared to NSAIDs, though not statistically significant, both cDMARDs and tDMARDs were noted to demonstrate higher odds for resolution of enthesitis. Further, a lower joint activity at baseline was observed to result in better resolution of enthesitis.

Data from observational cohorts complement those obtained from randomized clinical trials. Despite enthesitis being evaluated in clinical trials for the last 20 years, studies using data from observational cohorts are sparse. Polachek et al have described an enthesitis prevalence of 35% in a smaller sample from the same cohort.[6] Nonetheless, it is important to note 2 methodological differences between the studies. First, the study period in the earlier study[6] was 6 years (2008–2014) as compared to 20 years in the current study. Second, the outcome measurement tool used by Polachek et al[6] was the SPARCC Enthesitis Index, which includes only the peripheral sites, whereas in this study, we have expanded the selection of enthesitis sites to include axial sites using the MASES and medial femoral condyles using the LEI.[20-22] To our knowledge, this is the first study including all sites from the enthesitis indices in a large number of patients with PsA. Data from the CorEvitas PsA/Spondyloarthritis (SpA) Registry describes the prevalence of enthesitis, measured by SPARCC, to be 27%.[5] A recent systematic review and meta-analysis on prevalence of extraarticular manifestations in PsA has described a pooled prevalence estimate of 30% for enthesitis from 29 studies.[23] A wide range of outcome measurement instruments and diversity in the study population may explain the disparity in prevalence rates. The majority of patients in the current study had only 2 sites of clinical enthesitis. This is comparable to findings of Polachek et al, and another study including 1505 heterogeneous patients with SpA from Brazil, reporting a median of 1.8 enthesitis sites.[6,24]

Downloaded on October 7, 2026 from www.jrheum.org

Table 2. Number of patients in each category of medications with details of resolution of enthesitis (N = 526).

Medications in Each Category	n (%)	No. of Patients on Each Medication (%)	Average Time on Treatment, Years (SD)	Resolution of Enthesitis, n (%)	
				Yes	No
Category I	142 (27.00)		2.58 (3.69)	117 (82.39)	25 (17.61)
No medication		52 (36.66)	NA		
NSAID		90 (63.38)	2.58 (3.69)		
Category II	196 (37.26)		3.06 (4.58)	173 (88.26)	23 (11.73)
Methotrexate		150 (76.53)[a]	2.93 (4.61)		
Leflunomide		29 (14.79)	1.74 (2.82)		
Sulfasalazine		32 (16.32)	2.69 (3.50)		
Azathioprine		10 (5.10)	5.82 (7.00)		
Cyclosporine		2 (1.02)	2.34 (0.33)		
Category III	188 (35.74)		1.72 (2.23)	163 (86.70)	25 (13.30)
Targeted bDMARDs					
TNFi[b]		155 (82.45)	1.86 (2.39)		
IL-17i[c]		14 (7.44)	1.18 (1.09)		
IL-12/23i, IL-23i		18 (9.57)	0.94 (0.97)		
Targeted sDMARDs					
PDE-5i (Apremilast)		1 (0.50)	–		
JAKi (Tofacitinib)		0 (0)	–		
Total patients with and without resolution of enthesitis				453 (86.12)	73 (13.88)
			Male	240 (52.98)	41 (56.16)
			Females	213 (47.02)	32 (43.83)

[a] Percentage of individual medications do not add to 100 as some patients were on combination cDMARDs. [b] Includes etanercept, adalimumab, infliximab, golimumab, and certolizumab pegol. [c] Includes secukinumab and ixekizumab. bDMARD: biologic disease-modifying antirheumatic drug; IL-17i: interleukin 17 inhibitor; IL-12/23i: interleukin 12/23 inhibitor; JAKi: Janus kinase inhibitor; NA: not applicable; NSAID: nonsteroidal antiinflammatory drug; PDE-5i: phosphodiesterase-5 inhibitor; sDMARD: synthetic disease-modifying antirheumatic drug; TNFi: tumor necrosis factor inhibitor.

Table 3. Association between treatment and resolution of enthesitis.

	Univariable Model		Multivariable Model	
	OR (95% CI)	*P*	OR (95% CI)	*P*
Sex, male	1.61 (0.97-2.68)	0.07	1.66 (0.97-2.84)	0.06
Baseline age, yrs	1.00 (0.98-1.02)	0.85	1.00 (0.98-1.02)	0.98
Baseline PsA duration, yrs	1.00 (0.98-1.03)	0.81	1.00 (0.97-1.03)	0.99
Baseline enthesitis count	0.96 (0.87-1.06)	0.45	0.97 (0.87-1.09)	0.65
Baseline actively inflamed joint count	0.98 (0.96-1.00)	0.03	0.97 (0.95-0.99)	0.01
BMI, kg/m^2	1.01 (0.97-1.05)	0.69	1.02 (0.97-1.06)	0.49
Nail lesions	1.26 (0.76-2.08)	0.37	1.27 (0.75-2.15)	0.38
Fibromyalgia	1.01 (0.56-1.82)	0.97	1.31 (0.69-2.47)	0.41
Medication category		0.58*		0.43*
Category I	Ref	Ref	Ref	Ref
Category II	1.40 (0.74-2.63)	0.30	1.51 (0.78-2.91)	0.30
Category III	1.24 (0.67-2.31)	0.50	1.42 (0.74-2.71)	0.22

* Global *P* value. OR: odds ratio; PsA: psoriatic arthritis.

An interesting observation in our present study was the complete resolution of enthesitis, regardless of the category of medication, within a year of therapy in 86% of the patients. The mean time to enthesitis resolution could be a reflection of the study design, as patients are followed up only once in 6 months and it is not possible to record resolution of enthesitis prior to the first follow-up. Comparable estimates for complete resolution of enthesitis (82% by MASES) were observed in the ustekinumab arm of the Enthesial Clearance in Psoriatic Arthritis (ECLIPSA) study, assessing the efficacy of ustekinumab and tumor necrosis factor inhibitor (TNFi) in the clearance of enthesitis.[25] Nevertheless, there are scarce data on treatment effect on enthesitis in a real-life setting. The equivalence of medication categories in complete resolution of enthesitis in this study seems to contrast with the recent PsA treatment recommendations, which are weighed in favor of tDMARDs.[12-14] In routine clinical practice, therapeutic decisions in patients with PsA are heavily biased toward joint and skin activity, compared

Downloaded on October 7, 2026 from www.jrheum.org

to other clinical domains. Though most clinical trials of tDMARDs demonstrate an across-the-board effect for all the clinical domains of PsA, for individual patients the effectiveness may vary between domains as well as in time to response. In a recent systematic review on treatment of enthesitis in PsA with biologics, the pooled analysis from 18 studies indicated similar efficacy for TNFi and novel agents including ustekinumab and interleukin-17 inhibitors.[26] A recent post hoc analysis of the Efficacy of Secukinumab Compared to Adalimumab in Patients With Psoriatic Arthritis (EXCEED) trial exploring detailed enthesitis treatment response to secukinumab and adalimumab demonstrated no difference in efficacy between these medications.[27] Data on cDMARDs from clinical trials and real-life settings are very limited, inevitably explaining the weak recommendations in their favor. In the SEAM-PsA trial, resolution of enthesitis was observed in 43.1%, 52.6%, and 47.5% of patients on methotrexate (MTX) monotherapy, etanercept monotherapy, and combination therapy, respectively, with no statistical difference between the 3 groups.[28] In yet another open-label trial assessing the efficacy of MTX in various domains of PsA, a significant drop in mean LEI scores from 1.6 to 0.1 was noted in 6 months.[29] Assessment of efficacy of MTX in the Tight Control in Psoriatic Arthritis (TICOPA) trial demonstrated a significant change in the proportion of patients with enthesitis from baseline to 12 weeks.[30] In this context, findings of our current study will have important implications for clinical practice in resource-constrained settings that are heavily dependent on cDMARDs.

It is also noteworthy that low peripheral joint activity at baseline demonstrated a significant association with complete resolution of enthesitis in this study. This observation well aligns with data from the CorEvitas PsA/SpA Registry, in which patients with enthesitis had worse arthritis and were less likely to achieve minimal disease activity as compared to those without enthesitis.[5] However, in the ECLIPSA study, joint activity was not a significant predictor for clearance of enthesitis. The strict enthesitis phenotype of patients included in this study, along with their relatively small numbers, could explain this discordance from our finding.[25]

A few limitations of this study should be considered. Patients attending the University of Toronto PsA clinic could have a referral bias. A sizable number of patients who get referred would have already been started on medications by their family physicians, dermatologists, or other rheumatologists prior to visiting the clinic. The study is observational in nature and although data were obtained prospectively, treatment categories were not randomized. Moreover, included patients may already be on treatment at baseline; we did not restrict the analysis to patients commencing new treatment for active disease in the enthesitis domain or other domains. The large proportion of patients achieving complete resolution of enthesitis in our study would have resulted in masking differences in effectiveness between medication categories. The relatively long disease duration of patients included in this study may have contributed to the heterogeneity in the severity of enthesitis, with early disease presumably presenting with more active enthesitis. We did not evaluate individual drugs or examine mutually exclusive drug classes. Moreover, we did not account for missing data. Notwithstanding these limitations, this study does provide significant insights regarding the increased prevalence and treatment outcomes of enthesitis in a large, real-life, longitudinal PsA cohort.

Clinical examination of enthesitis has its own pitfalls in differentiating inflammatory from metabolic, mechanical, and degenerative processes in certain classes of patients.[3,4] Imaging studies have aided in mapping the distribution of active and structural enthesitis with better precision. Ultrasound (US) studies detecting enthesitis have clearly emphasized a discordance from clinical evaluation.[31] Whole-body magnetic resonance imaging (MRI) may evolve as a promising technique for the future in PsA enthesitis evaluation as it can image a sizable number of peripheral and axial entheses not accessible by clinical examination, within an hour.[32] A combination of clinical assessment and imaging techniques in future studies may be ideal to characterize the real burden of enthesitis in PsA. This may also be helpful in differentiating active enthesitis from FM, which is often challenging to distinguish by clinical assessment.[33]

In conclusion, enthesitis is common in patients with PsA, and its resolution occurs regardless of the medication prescribed in an observational setting. Patients with lower joint activity at baseline have a better chance of achieving complete resolution of enthesitis. Given the low accuracy of clinical assessment of enthesitis, future effectiveness studies may warrant evaluation with advanced imaging techniques, including US and MRI, for better outcome measurement.

REFERENCES

1. Alinaghi F, Calov M, Kristensen LE, et al. Prevalence of psoriatic arthritis in patients with psoriasis: a systematic review and meta-analysis of observational and clinical studies. J Am Acad Dermatol 2019;80:251-65.
2. Ritchlin CT, Colbert RA, Gladman DD. Psoriatic arthritis. N Engl J Med 2017;376:957-70.
3. Rida MA, Chandran V. Challenges in the clinical diagnosis of psoriatic arthritis. Clin Immunol 2020;214:108390.
4. Schett G, Lories RJ, D'Agostino MA, et al. Enthesitis: from pathophysiology to treatment. Nat Rev Rheumatol 2017;13:731-41.
5. Mease PJ, Karki C, Palmer JB, et al. Clinical characteristics, disease activity, and patient-reported outcomes in psoriatic arthritis patients with dactylitis or enthesitis: results from the Corrona Psoriatic Arthritis/Spondyloarthritis Registry. Arthritis Care Res 2017;69:1692-9.
6. Polachek A, Li S, Chandran V, Gladman DD. Clinical enthesitis in a prospective longitudinal psoriatic arthritis cohort: incidence, prevalence, characteristics, and outcome. Arthritis Care Res 2017;69:1685-91.
7. Taylor W, Gladman D, Helliwell P, Marchesoni A, Mease P, Mielants H; CASPAR Study Group. Classification criteria for psoriatic arthritis: development of new criteria from a large international study. Arthritis Rheum 2006;54:2665-73.
8. Kavanaugh A, Helliwell P, Ritchlin CT. Psoriatic arthritis and burden of disease: patient perspectives from the population-based Multinational Assessment of Psoriasis and Psoriatic Arthritis (MAPP) Survey. Rheumatol Ther 2016;3:91-102.
9. Polachek A, Cook R, Chandran V, Gladman DD, Eder L. The

Downloaded on October 7, 2026 from www.jrheum.org

association between sonographic enthesitis and radiographic damage in psoriatic arthritis. Arthritis Res Ther 2017;19:189.
10. Mease P. Enthesitis in psoriatic arthritis (Part 3): clinical assessment and management. Rheumatology 2020;59 Suppl 1:i21-8.
11. Orbai AM, de Wit M, Mease P, et al. International patient and physician consensus on a psoriatic arthritis core outcome set for clinical trials. Ann Rheum Dis 2017;76:673-80.
12. Singh JA, Guyatt G, Ogdie A, et al. 2018 American College of Rheumatology/National Psoriasis Foundation guideline for the treatment of psoriatic arthritis. Arthritis Rheum 2019;71:5-32z.
13. Gossec L, Baraliakos X, Kerschbaumer A, et al. EULAR recommendations for the management of psoriatic arthritis with pharmacological therapies: 2019 update. Ann Rheum Dis 2020;79:700-12.
14. Coates LC, Kavanaugh A, Mease PJ, et al. Group for Research and Assessment of Psoriasis and Psoriatic Arthritis 2015 treatment recommendations for psoriatic arthritis. Arthritis Rheumatol 2016;68:1060-71.
15. Kerschbaumer A, Smolen JS, Dougados M, et al. Pharmacological treatment of psoriatic arthritis: a systematic literature research for the 2019 update of the EULAR recommendations for the management of psoriatic arthritis. Ann Rheum Dis 2020;79:778-86.
16. Gladman DD, Chandran V. Observational cohort studies: lessons learnt from the University of Toronto Psoriatic Arthritis Program. Rheumatology 2011;50:25-31.
17. Chandran V, Schentag CT, Gladman DD. Sensitivity of the classification of psoriatic arthritis criteria in early psoriatic arthritis. Arthritis Rheum 2007;57:1560-3.
18. Mease PJ, Van den Bosch F, Sieper J, Xia Y, Pangan AL, Song I. Performance of 3 enthesitis indices in patients with peripheral spondyloarthritis during treatment with adalimumab. J Rheumatol 2017;44:599-608.
19. Mackenzie H, Thavaneswaran A, Chandran V, Gladman DD. Patient-reported outcome in psoriatic arthritis: a comparison of web-based versus paper-completed questionnaires. J Rheumatol 2011;38:2619-24.
20. Maksymowych WP, Mallon C, Morrow S, et al. Development and validation of the Spondyloarthritis Research Consortium of Canada (SPARCC) Enthesitis Index. Ann Rheum Dis 2009;68:948-53.
21. Heuft-Dorenbosch L, Spoorenberg A, van Tubergen A, et al. Assessment of enthesitis in ankylosing spondylitis. Ann Rheum Dis 2003;62:127-32.
22. Healy PJ, Helliwell PS. Measuring clinical enthesitis in psoriatic arthritis: assessment of existing measures and development of an instrument specific to psoriatic arthritis. Arthritis Rheum 2008;59:686-91.
23. Pittam B, Gupta S, Harrison NL, Robertson S, Hughes DM, Zhao SS. Prevalence of extra-articular manifestations in psoriatic arthritis: a systematic review and meta-analysis. Rheumatology 2020;59:2199-206.
24. Carneiro S, Bortoluzzo A, Goncalves C, et al. Effect of enthesitis on 1505 Brazilian patients with spondyloarthritis. J Rheumatol 2013;40:1719-25.
25. Araujo EG, Englbrecht M, Hoepken S, et al. Effects of ustekinumab versus tumor necrosis factor inhibition on enthesitis: results from the enthesial clearance in psoriatic arthritis (ECLIPSA) study. Semin Arthritis Rheum 2019;48:632-37.
26. Mourad A, Gniadecki R. Treatment of dactylitis and enthesitis in psoriatic arthritis with biologic agents: a systematic review and metaanalysis. J Rheumatol 2020;47:59-65.
27. Kaeley GS, Schett G, Conaghan PG, et al. Enthesitis in patients with psoriatic arthritis treated with secukinumab or adalimumab: a post hoc analysis of EXCEED [abstract]. Ann Rheum Dis 2021;80:311-2.
28. Mease PJ, Gladman DD, Collier DH, et al. Etanercept and methotrexate as monotherapy or in combination for psoriatic arthritis: primary results from a randomized, controlled phase III trial. Arthritis Rheum 2019;71:1112-24.
29. Appani SK, Devarasetti PK, Irlapati RVP, Rajasekhar L. Methotrexate achieves major cDAPSA response, and improvement in dactylitis and functional status in psoriatic arthritis. Rheumatology 2019;58:869-73.
30. Coates LC, Helliwell PS. Methotrexate efficacy in the Tight Control in Psoriatic Arthritis study. J Rheumatol 2016;43:356-61.
31. Michelsen B, Diamantopoulos AD, Soldal DM, Hammer HB, Kavanaugh A, Haugeberg G. Achilles enthesitis defined by ultrasound is not associated with clinical enthesitis in patients with psoriatic arthritis. RMD Open 2017;3:e000486.
32. Poulsen AEF, Axelsen MB, Poggenborg RP, et al. Whole-body magnetic resonance imaging in psoriatic arthritis, rheumatoid arthritis, and healthy controls: interscan, intrareader, and interreader agreement and distribution of lesions. J Rheumatol 2021; 48:198-206.
33. Macchioni P, Salvarani C, Possemato N, et al. Ultrasonographic and clinical assessment of peripheral enthesitis in patients with psoriatic arthritis, psoriasis and fibromyalgia syndrome: the ULISSE study. J Rheumatol 2019;46:904-11.

Downloaded on October 7, 2026 from www.jrheum.org