The Uses of Disease Activity Scoring and the Physician Global Assessment of Disease Activity for Managing Rheumatoid Arthritis in Rheumatology Practice

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ABSTRACT. ***Objective.*** To evaluate the uses of quantitative disease activity scoring and a physician global assessment of disease activity for managing rheumatoid arthritis (RA) in rheumatology practice.

Methods. The Global Arthritis Score (GAS) and a physician global assessment (Physician Global) were determined during each office visit for a community practice RA population. The GAS was calculated from patients' self-reported pain, functional assessment, and tender joint count. The Physician Global was recorded on a 10-point visual analog scale. The correlation of these 2 disease activity measures was determined for the most recent office visit of 185 patients with RA, and the reasons for discordant results were identified by chart review.

Results. The GAS and Physician Global were concordant for active or inactive disease in 126 of 185 patients (68%) and were discordant in 59 (32%). Forty-five of these discordant patients had a high GAS while their Physician Global indicated inactive disease. Their GAS values were high because of osteoarthritis, back pain, soft tissue rheumatism, and/or prior joint damage rather than active RA. The other 14 patients had a low GAS with an uncontrolled Physician Global for a variety of reasons.

Conclusion. (1) An RA disease activity score and a quantitative Physician Global can be measured during rheumatology office visits to document patients' disease status. (2) Disease activity scoring contributes valuable information, but should not replace the Physician Global in guiding RA patient management or reimbursement decisions. (First Release April 15 2009; J Rheumatol 2009;36:925–9; doi:10.3899/jrheum.081046)

Key Indexing Terms:
RHEUMATOID ARTHRITIS DISEASE ACTIVITY PHYSICIAN PRACTICE PATTERNS

New treatments offer many patients control of rheumatoid arthritis (RA) with resolution of symptoms, and improved function and longterm outcomes[1-5]. The TICORA (Tight Control of Rheumatoid Arthritis) study suggests that achieving these possibilities depends first on monitoring disease activity accurately, and then accelerating treatment to achieve the best possible disease control[6]; however, this level of care is not being achieved reliably at present[6,7]. Rheumatologists are also being challenged by the Quality Movement, Pay for Performance programs, and drug precertification schemes to measure disease activity and document optimal disease control[8,9], but how to do this is still unclear[10-12].

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Assessing RA disease activity presents a relatively complex challenge because it is inferred from multiple clinical observations rather than a single measurable test, as is possible for many other chronic diseases[8,13]. These observations include patient- and physician-generated data and laboratory tests of acute-phase reactants in the near term, and monitoring of structural joint damage in the longer term. Multifactorial disease activity scoring systems, including the Disease Activity Score (DAS) and American College of Rheumatology (ACR) criteria, have been developed to measure the effects of single treatments in selected patient populations within clinical trials[14-16], but these approaches are viewed by many rheumatologists to be impractical for clinical practice due to their complexities and/or delayed availability beyond the clinical encounter.

The modified DAS 28-joint count (DAS28) is used widely in Europe to influence therapeutic and reimbursement decisions[15,17], and other, real-time quantitative measures of RA disease activity have also been developed that correlate with it (Table 1). These include various iterations of the Health Assessment Questionnaire (HAQ) {Multidimensional HAQ (MDHAQ) and Routine Assessment of Patient Index Data (RAPID)}[18], the Clinical Disease Activity Index (CDAI)[19], the Global Arthritis Score (GAS)[20,21], and the

Table 1. Components of several RA clinical Disease Activity Scores*.

	DAS28	MDHAQ	RAPID	CDAI	GAS	PDAS2
Function (HAQ)		X	X		X	
Patient pain VAS			X		X	X
Patient global	X		X	X		X
Tender joint count	X			X	X	X
Swollen joint count	X			X		X
Physician global				X		
ESR/CRP	X					

* Modified Disease Activity Score 28, Multidimensional Health Assessment Questionnaire, Routine Assessment of Patient Index Data, Clinical Disease Activity Index, Global Arthritis Score, and Patient-Based Disease Activity Score. VAS: visual analog scale; ESR: erythrocyte sedimentation rate; CRP: C-reactive protein.

Patient-based Disease Activity Score (PDAS2)[22]. There is no evidence that rheumatologists in the United States have adopted the DAS28 or any of these simpler alternatives in their clinical decision-making, preferring instead to use a qualitative, variably informed physician global assessment of disease activity (Physician Global)[20]. Using disease activity scoring has in fact been called into question as the primary criterion for clinical and reimbursement decision-making, because of a low correlation between the DAS28 and the Physician Global in practice populations[10].

This study was prompted by my observing discordance between disease activity scores (GAS) and the quantitative Physician Global in individual patients while using these measures in a community rheumatology practice. Data are reported for the most recent office visit of all patients with RA, and the implications of this information for clinical decision-making are considered. The relationships of these measures to patients' disease characteristics, demographics, and treatments are also explored.

MATERIALS AND METHODS

Practice environment and RA clinical improvement project. My rheumatology practice of 30 years' duration in Madison, Wisconsin, is community-based and is owned currently by the University of Wisconsin Medical Foundation (UWMF). The methods and results described in this report are derived from a rheumatology practice improvement project that uses Plan-Do-Study-Act methods[23]. The University of Wisconsin Institutional Review Board has exempted this project since it does not involve hypothesis-based research with patient controls and is focused on improving patient care rather than expanding knowledge.

Patient population and RA patient registry. A registry of seropositive and seronegative patients with RA managed by me was populated initially from electronic billing data using *International Classification of Diseases*, 9th ed. codes 714.0 and 714.9. It has been refined over the last 3 years by adding patients with RA who were not included initially, eliminating those with other seronegative arthritides, and removing patients no longer managed by this practice. Patients have not been limited to those meeting ACR criteria for RA. The registry currently includes 185 patients with RA whose data are included in this report. The practice has been closed to new consultations since 2006, so all patients have a disease duration of at least 2 years.

Standardized visit data set. Comprehensive clinical information is recorded during each office visit by using the CORRONA™ clinical research data forms with permission from the Consortium of Rheumatology Researchers of North America (CORRONA). These include sections completed by the patient and rheumatologist.

Disease activity scoring. We have elected to use the Global Arthritis Score (GAS) developed by J.J. Cush, MD, during established RA patient office visits[20]. The GAS is calculated by a nurse during patient check-in from the CORRONA form completed by patients in the waiting room, and is verified during the physician-patient encounter. It includes a pain visual analog scale (VAS), an 8 question functional assessment (mHAQ), and a patient-generated 28 tender joint count homunculus. Patients self-reported their tender joint counts on a homunculus based on a report validating this alternative to physican-generated values[24]. A maximum of 62 points include the 0–10 Pain VAS + the 0–24 mHAQ (8 questions × 0–3 points for normal or mildly, moderately, or severely impaired function) + the 0–28 tender joint count. Acceptable preliminary correlations with the DAS28 have been reported[20,21], but ranges for controlled, mild, and severe disease, as are defined for the DAS28, have not. A conservative value of greater than 10 has been used to separate normal from high GAS scores for this report. In fact, GAS values calculated during patient visits fall along a continuum, and the cutpoint used in my routine care, and this analysis, appears to best distinguish low levels of noise in patients' reports from clinically significant symptoms.

Physician Global Assessment of Disease Activity. The standardized data set includes a 0–10 continuous VAS for recording the Physician Global. I mark low values approximately in the 0–1 range to indicate controlled or equivocal RA disease activity, and values in the 1.1–4, 4.1–8, and 8.1–10 ranges for mild, moderate, and high activity, similar to the conventions published by Wolfe and coauthors[10]. The correlations among Physician Globals across time for individual rheumatologists and across multiple rheumatologists have not been studied to my knowledge. Physician Globals in the 0–1 range are classified as "controlled" and those above 1 as "uncontrolled" in this study.

Study data. The GAS and Physician Global have been calculated routinely during each established RA patient visit for the last 3 years. Each patient's most recent visit values prior to January 1, 2008, were used for this study, almost always obtained within the preceding 6 months. The date of RA onset was obtained from their initial data sets based on recall, and confirmed when possible from past medical records. CORRONA data and dictated visit reports were used to identify the factors contributing to discordant GAS and Physician Global values in the patient subset with a high GAS and controlled Physician Global, and in those with a normal GAS and uncontrolled Physician Global. These records were also used to determine each patient's treatment at the time of her/his GAS and Physician Global measurements.

RESULTS

Patient population and treatments. The 185 registered RA patients' ages varied from 29 to 88 years (mean 63, median 64) and disease duration from 2 to 51 years (mean and median 18). RA treatments included a single disease modifying antirheumatic drug (DMARD; methotrexate, leflunomide, or hydroxychloroquine) in 75 (40%) patients, 2 or more DMARD in 25 (14%), a biologic therapy (adalamumab, etanercept, or infliximab) in combination with DMARD treatment in 55 (30%), or biologic monotherapy in 16 (8%). One patient had received a course of rituximab. Eighty-five patients (46%) were receiving prednisone, generally in low supplemental doses of 5 mg/day or less. Eleven (6%) of these were receiving prednisone monotherapy. Three patients (2%) were off treatment with clinically controlled

disease. The disease duration of the 55 patients receiving combination biologic-DMARD therapy varied from 2 to 36 years (median 17), while the other patients varied from 2 to 51 years with a slightly higher median of 22 years.

GAS and Physician Global results. Table 2 shows the distributions of the most recent GAS and Physician Global results in the 185 registered patients with RA. Moderate and severe disease activity are infrequent in this treated population. Table 3 indicates the concordance or discordance of these 2 measures in the individual patients. The 4 groups include: (A) low GAS (0–10): controlled Physician Global (0–1); (B) low GAS: uncontrolled Physician Global (> 1); (C) high GAS (> 10): controlled Physician Global; and (D) high GAS: uncontrolled Physician Global. Patients' RA was clinically controlled in 149 patients (80%; A + C) and uncontrolled in 36 (B + D), based on the Physician Global. The GAS was low in 104 of the controlled patients (A), but was high in 45 others (C). Therefore, the GAS and Physician Global were concordant in 126 patients (68%; A + D) and discordant in 59 (32%; B + C). The correlation of the GAS and Physician Global for the entire population was 0.453 using Pearson's correlation coefficient.

The reasons for discordant GAS and Physician Global values in Group B and C patients were determined by chart review. In the 14 Group B patients, the low GAS and uncontrolled Physician Global values were explained by oligo-articular seropositive RA with low effects on symptoms and function, a borderline elevated Physician Global, or rarely, more widespread synovitis without reported symptoms. In the 45 Group C patients, the high GAS and controlled Physician Global values were explained in all cases by 1 or more of the comorbidities listed in Table 4. Documentation of these comorbidities was complete because the high GAS prompted the author to define and document them during the encounter. Nine of the 22 concordant patients in Group D with active synovitis also had other contributors to their high GAS.

The frequencies of active RA and other factors differed with disease duration in high GAS patients. Patients with less than 10 years of disease included 40% of those with an uncontrolled and 22% of those with a controlled Physician Global. With 30 or more years of disease, the percentages were reversed, 14% uncontrolled versus 29% controlled, and with 10–29 years of disease, they were similar at 46% and 49%, respectively.

Relationship of the Physician Global to treatments. The 36 patients with an uncontrolled Physician Global were distributed across all treatment groups as was their prednisone use. Eighty-five percent of DMARD-treated and 75% of biologic-treated patients had a controlled Physician Global.

Table 2. Distributions of Global Arthritis Scores (GAS) and physician global assessment of disease activity (Physician Global) in 185 patients with established rheumatoid arthritis.

GAS		Physician Global	
Value	n (%)	Value	n (%)
0–5.0	80 (43)	0–0.5	127 (69)
5.1–10	38 (20)	0.6–1.0	22 (12)
10.1–15	26 (14)	1.1–1.5	11 (6)
15.1–20	16 (9)	1.6–2.0	12 (6)
20.1–25	7 (4)	2.1–2.5	3 (1.5)
25.1–30	8 (4)	2.6–3.0	3 (1.5)
30.1–35	6 (3)	3.1–3.5	3 (1.5)
35.1–40	3 (2)	3.6–4.0	1 (0.5)
40.1–45	0 (0)	4.1–4.5	0 (0)
45.1–50	1 (1)	4.6–5.0	1 (0.5)
≥ 50.1	0 (0)	≥ 5.1	2 (0.5)

Table 3. Correlations between the Global Arthritis Score (GAS) and physician global assessment of disease activity (Physician Global) in 185 patients with established rheumatoid arthritis. Number of patients (% of total patients).

	Physician Global (VAS)		
GAS	Controlled (0–1)	Uncontrolled (1.1–10)	Subtotals
Low 0–10)	A. 104 (56)	B. 14 (8)	118 (64)
High (10.1–62)	C. 45 (24)	D. 22 (12)	67 (36)
Subtotals	149 (80)	36 (20)	

DISCUSSION

The purpose of this study and our clinical improvement project was not to document improved disease outcomes related to disease activity scoring, as was demonstrated already in the TICORA study, but to implement that research finding in routine RA management. Its strengths are using chart review to recognize the reasons for discordant GAS and Physician Global results, and providing an example of successful practice-based quantitative disease activity assessment. The utility of the GAS is that, like the MDHAQ, it provides a quantitative real-time patient self-report of symptoms and function, information that is otherwise variably recorded during the clinical encounter with greater time and effort for both the patient and physician. The study design is appropriate for this clinical

Table 4. Comorbidities that explain high GAS scores in the 45 Group C patients with a controlled Physician Global*.

Comorbidity	N
Erosive joint damage	23
Low back pain	17
Osteoarthritis	10
Soft tissue pain	10
Atypical joint pain	7
Other functional disabilities	1
Unexplained high score	1

* 11 patients had 2 or more comorbidities identified. GAS: Global Arthritis Score.

improvement project[25]. In particular, using a single-practice population mirrors individual rheumatologists' perspectives.

The observation that the GAS and Physician Global may be discordant in individual patients due to factors other than active RA suggests that a high disease activity score should not lead to automatic acceleration of treatment, as the TICORA study and others have implied. Instead, it should prompt a detailed clinical assessment to identify and document the factors contributing to a high disease activity score. It is unlikely that this will be done dependably during patient visits focused on RA management without disease activity scoring.

In our study, the 45 discordant patients with a GAS above 10 and a Physician Global of 0–1 (Table 3, Group C) had no morning stiffness, symptom patterns suggesting active RA, and/or synovitis on joint examination, but they did have other comorbidities (Table 4) to account for their high GAS values. These patients were more common among those with longer disease duration, but were also found among those with shorter disease duration. This discordance explains the moderate correlation coefficient between the GAS and Physician Global in this clinical RA population.

A low correlation between the DAS28 disease activity score and the Physician Global was also shown in a previous study of pooled RA populations from multiple practices, although the contribution of comorbidities to this discordance was not reported[10]. The authors concluded that disease activity scoring should not determine treatment and insurance coverage decisions in clinical practice. In contrast, clinical research trials generally show closer agreement between disease activity scores and Physician Globals because patients with comorbidities are excluded. The TICORA study did not report Physician Global assessments or consider the influence of comorbidities. Indeed, patients with more than 5 years of disease, who might have had more of these, were excluded[6].

These findings support the approach of many rheumatologists, including me, of using the Physician Global for guiding RA management in clinical practice (Figure 1). The goal should be to implement an accurate and reproducible Physician Global. This measurement should be quantitative, and informed by standardized clinical, laboratory, and imaging data. It is less important in this paradigm that the same disease activity score is used by different rheumatologists than that we begin using one of the several reported alternatives to measure patients' symptoms and function. In addition, it does not appear to be logical to include the Physician Global in the disease activity score, as does the CDAI (Table 1)[19]. This algorithm also recognizes that management decisions driven by the Physician Global should include a treatment benefit-risk assessment and consideration of each patient's goals and concerns.

My study illustrates the feasibility of standardizing the RA clinical database and disease activity assessment in clinical practice. Rheumatologists are more likely to engage in improving the Physician Global than we are to replace it with any disease activity score, and for the good reasons documented in this and other studies. Disease activity scoring in research and practice are fundamentally different, not only because the patient populations are different, but because the purposes are also.

More effective RA care will require an informed quantitative Physician Global with explicitly defined ranges for controlled, mild, moderate, and severe disease, and then accelerating treatment dependably for uncontrolled disease. These changes will enable pay-for-performance reporting,

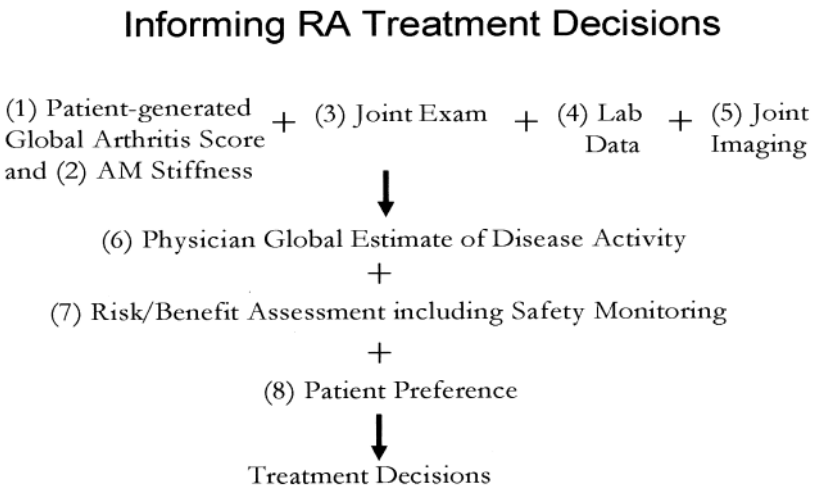

Figure 1. Informing RA treatment decisions. This algorithm outlines a logic for using the Physician Global Assessment, informed by comprehensive standardized clinical data, to direct care of patients with RA. It reflects the perspective that a quantitative disease activity score may be an important contributor to analyzing data and informing the Physician Global, but should not include or replace it in guiding disease management or reimbursement decisions.

provide the data being demanded increasingly by pharmacy management precertification programs, and contribute to practice-based clinical research. They are consistent with the ACR quality measures project[8,9].

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