

Introduction

- Clinical trials in rheumatoid arthritis (RA) routinely measure the DAS score to assess disease activity.
- The DAS involves complicated calculations and requires an ESR or CRP, rendering it cumbersome in the office setting.
- Several tools have been developed for quick, office-based assessment of RA disease activity, including the Rheumatoid Arthritis Disease Activity Index (RADAI), Clinical Disease Activity Index (CDAI), Routine Assessment of Patient Index Data (RAPID), and Global Assessment Score (GAS).

AIM

- This study examines the validity of these scores by comparing them to the DAS28-CRP, as well as change in DAS28-CRP.

Methods - Dataset

- Patients enrolled in Brigham Rheumatoid Arthritis Sequential Study (BRASS), a large single center cohort of RA patients in which demographic, genetic and functional status data is collected (2003-present).

- Analysis limited to subjects with data at both baseline and 1 year follow up (N=740).

- Baseline and annual data collected:
 - tender joint count (TJC)
 - swollen joint count (SJC)
 - patient global assessment (PGA)
 - evaluator global assessment (EGA)
 - physical function
 - inflammatory markers: ESR and CRP
 - medication use

Methods – Statistical Analysis

- Validity was assessed by calculating the correlation of each continuous office-based score (RADAI, CDAI, RAPID and GAS) with DAS28-CRP and mHAQ at baseline, using Spearman's correlation coefficient.

- Furthermore, change in the office-based score from 0 to 12 months was correlated with Δ DAS28-CRP and Δ mHAQ using Spearman's correlation coefficient.

Methods - Derived Variables

Table 1: Variables utilized in RA assessment tools*

	Lab Measure	Physician Assessed Measures			Self Reported Measures				
		ESR or CRP	EGA	TJC	SJC	PGA	TJC	Physical function	AM stiffness
ACR core data set	X	X	X	X	X		X		X
DAS28-CRP	X	X (0-100)	X (0-28)	X (0-28)					
RADAI**					X (0-10, today and over past 6 mos)	X (0-48)		X	X
CDAI		X (VAS, cm)	X (0-28)	X (0-28)	X (cm)				
RAPID					X	X (0-48)	X		X
GAS			X (0-28)				X		X

*Abbreviations: ESR – erythrocyte sedimentation rate; CRP – c-reactive protein; EGA – evaluator global assessment; TJC – tender joint count; SJC – swollen joint count; PGA – patient global assessment.
 ** RADAI is modified version from the original one.

Results

Table 2: Baseline demographics for N=740 BRASS subjects

Female, N (%)	614 (83.0)
Age, mean years (SD)	57.06 (13.7)
Disease Duration, mean years (SD)	14.25 (12.3)
MDHAQ, median	0.5(0.0-2.5)
DAS28-CRP, mean (SD)	4.05 (1.5)
RF positive, N (%)	464 (63.8)
CCP positive, N (%)	479 (66.1)
Medications, N (%)	
None	24 (3.2)
Narcotics	73 (9.9)
NSAIDS	383 (51.8)
Corticosteroids	233 (31.5)
Plaquenil	129 (17.4)
Sulfasalazine	50 (6.8)
Leflunomide	76 (10.3)
Methotrexate without anti-TNF	225 (30.4)
Methotrexate with anti-TNF	126 (17.0)
Anti-TNF without MTX	151 (20.4)

Results

Table 3: Cross Sectional and Longitudinal Correlation of DAS28-CRP with MHAQ, RADAI, CDAI, RAPID and GAS

Change in activity score over one year	Baseline Score						Baseline Score
	DAS28-CRP	MHAQ	RADAI	CDAI	RAPID	GAS	
	0.38	0.39	0.74	0.62	0.44		
	<i>0.32</i>	<i>0.47</i>	<i>0.62</i>	<i>0.62</i>	<i>0.72</i>	<i>0.89</i>	
	<i>0.42</i>	<i>0.47</i>	<i>0.63</i>	<i>0.70</i>	<i>0.76</i>	<i>0.82</i>	
	<i>0.64</i>	<i>0.47</i>	<i>0.63</i>	<i>0.92</i>	<i>0.94</i>	<i>0.73</i>	
	<i>0.57</i>	<i>0.58</i>	<i>0.66</i>	<i>0.92</i>	<i>0.71</i>	<i>0.82</i>	
	<i>0.40</i>	<i>0.80</i>	<i>0.71</i>	<i>0.62</i>	<i>0.71</i>	<i>0.82</i>	
	Change in activity score over one year						

- Matrix displays correlation between various composite activity scores at baseline (upper diagonal half, blue) and correlations between the change in composite activity scores between 0 and 12 months (lower diagonal half, yellow and in italics).
 - For example, correlation between baseline DAS28-CRP and MHAQ is 0.38
 - Correlation between change in DAS28-CRP and MHAQ over 1 year is 0.32
- Thus, the most favorable correlation with DAS28-CRP at baseline is seen with CDAI (r=0.74) and RAPID (r=0.62).
- The most favorable correlation with Δ DAS28-CRP is seen with Δ CDAI (r=0.64) and Δ RAPID (r=0.57).

Conclusions

- This analysis suggests that less complex disease activity measures, such as the RAPID and CDAI, correlate moderately well with the more complex DAS score.
- The RAPID and CDAI can be more easily used in the office setting because they do not require measurement of an inflammatory marker.
- More widespread testing and validation of such disease activity measures is warranted.

Limitations

- Data is preliminary. Further analysis should include agreement between quartiles of each score, comparisons with ACR response criteria and radiographic change, and scores' sensitivity to change in response to treatment in clinical trials.