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Comparisons of Quality of Life, Resource Use and Physical Functioning in RA Patients Classified as High, Moderate or Low Risk for Rapid Radiographic Progression

Poster 1141

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REVISED ABSTRACT

Background/Purpose: We previously developed and validated a prognostic model to identify patients with rheumatoid arthritis (RA) with elevated risk of rapid radiographic progression (RRP). The objective of this study was to compare differences in clinical outcomes, quality of life (QoL) and healthcare resource use at 12 months in patients with high compared to moderate and low baseline predicted risk of RRP.
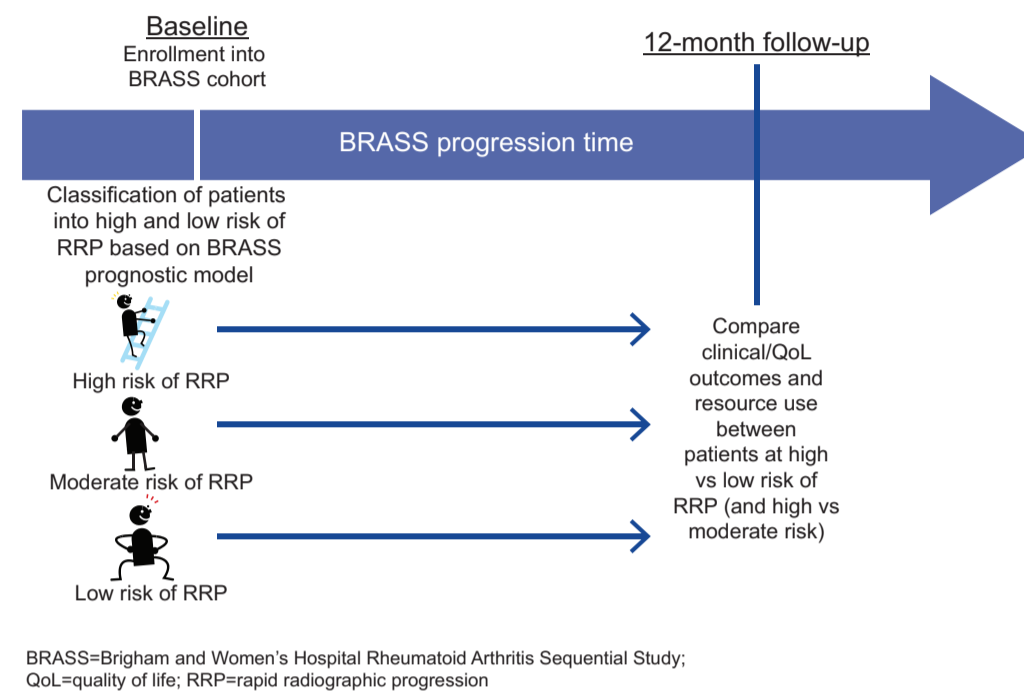
Methods: In a longitudinal cohort of RA patients with clinical and radiographic data, we applied a prognostic model to calculate the baseline probability of RRP.[1] Variables to determine the probability of RRP in the prognostic model included anti-cyclic citrullinated peptide positivity, RF positivity, body weight, DAS28-CRP and total Sharp score. Based on the calculated probability of RRP, patients were categorized into low risk (probability 0 to 0.1), moderate risk (probability >0.1 to 0.4) and high risk (probability >0.4) of RRP. The categorization was based on visual inspection of probability plots. Clinical outcomes were measured by DAS28-CRP, modified Health Assessment Questionnaire (mHAQ), swollen and tender joint counts, BRASS Rheumatoid Arthritis Disease Activity Index (BRASS RADAI) and physical global assessment of disease; QoL outcome was measured by EQ5D; and healthcare resource use by assessing the percentage of patients with nursing home visits, home healthcare visits, surgeries, durable medical equipment use, hospitalization and ER visits. We compared each of these domains across patients with high versus low and high versus moderate RRP at 12 months using linear regression models for continuous variables.

Results: In the RA cohort, 757 (56.4%) patients had adequate data to calculate RRP. Of these, 310 (41.0%) were classified as low, 421 (42.4%) as medium and 126 (16.4%) as high risk of RRP at baseline. Patients in the low-risk group when compared with those in the moderate- and high-risk groups tended to be younger (mean [SD] 55.0 years [14.70], 55.37 [14.64], 63.63 [10.98], respectively), have a lower number of swollen or tender joints (mean [SD] 11.98 [12.25], 16.16 [13.83], 29.56 [14.95], respectively), and less likely to be treated with a biologic DMARD (n [%] 100 [32.3], 148 [46.1], 71 [56.4], respectively). Patients in the low- versus high-risk groups had higher QoL, lower healthcare resource use and higher physical functioning at 12 months (see Figure 3 and Figure 4).

Conclusion: Patients categorized as having high risk of future RRP at baseline (compared with moderate and low risk of RRP) had worse clinical and QoL outcomes as well as higher healthcare resource use at 12 months.

Reference: 1. Alemao EA, et al. *Ann Rheum Dis* 2014;**73**(Suppl 2):603.

INTRODUCTION

- A prognostic model to identify patients at risk of rapid radiographic progression (RRP) was developed using data from the Brigham and Women's Hospital Rheumatoid Arthritis Sequential Study (BRASS) Registry and has been validated with data from the Abatacept versus adaliMumab comParison in bioLogic-naïve RA subjects with background mEthotrexate (AMPLE) trial.[1-3]
- Radiographic progression in RA is associated with high disease activity leading to joint destruction, as well as increased healthcare resource utilization.

OBJECTIVES

- To use a prognostic model to classify patients from the BRASS Registry into low, moderate or high risk of RRP at baseline.
- To evaluate clinical and quality-of-life (QoL) outcomes, and healthcare resource use, at 12 months, by baseline risk of RRP.
- Hypothesis: Patients with a high baseline risk of radiographic progression would experience overall worse outcomes compared with patients at low risk.

METHODS

- We studied patients from BRASS, a prospective longitudinal cohort of patients with RA.
  - Majority established RA evaluated semi-annually on multiple clinical patient-reported outcomes and healthcare resource utilization parameters.
- We evaluated the baseline probability distribution of RRP for categorization of patients into low, moderate and high risk of RRP using a previously defined and validated algorithm based on a prognostic model that included modified total Sharp score (mTSS; X-ray), seropositivity and other parameters (Figure 1).[1]

Figure 1. Study Design

BRASS=Brigham and Women's Hospital Rheumatoid Arthritis Sequential Study; QoL=quality of life; RRP=rapid radiographic progression

Outcomes of interest

- Clinical outcomes were assessed using the DAS28-CRP, modified Health Assessment Questionnaire score (mHAQ), swollen joint count (SJC) and tender joint count (TJC), BRASS Rheumatoid Arthritis Disease Activity Index (BRASS RADAI) and physician global assessment of disease.
- QoL outcomes were assessed using the EQ5D.
- Healthcare resource utilization was defined as the percentage of patients with nursing home visits, home healthcare visits, surgeries, durable medical equipment (DME) use, hospitalization and emergency room (ER) visits.

Statistical analyses

- Univariate analysis was used to characterize patients by baseline risk of RRP.
- Linear regression models were used to compare continuous outcomes (DAS28-CRP, mHAQ, SJC and TJC, BRASS RADAI, physician global assessment of disease and EQ5D), controlling for baseline risk of RRP and covariates.

RESULTS

- The distribution of the probability of RRP at baseline in the BRASS registry is presented in Figure 2. Based on the quartiles of the distribution, patients were categorized into low risk (probability 0 to 0.1), moderate risk (>0.1 to 0.4) and high risk (>0.4) of RRP.

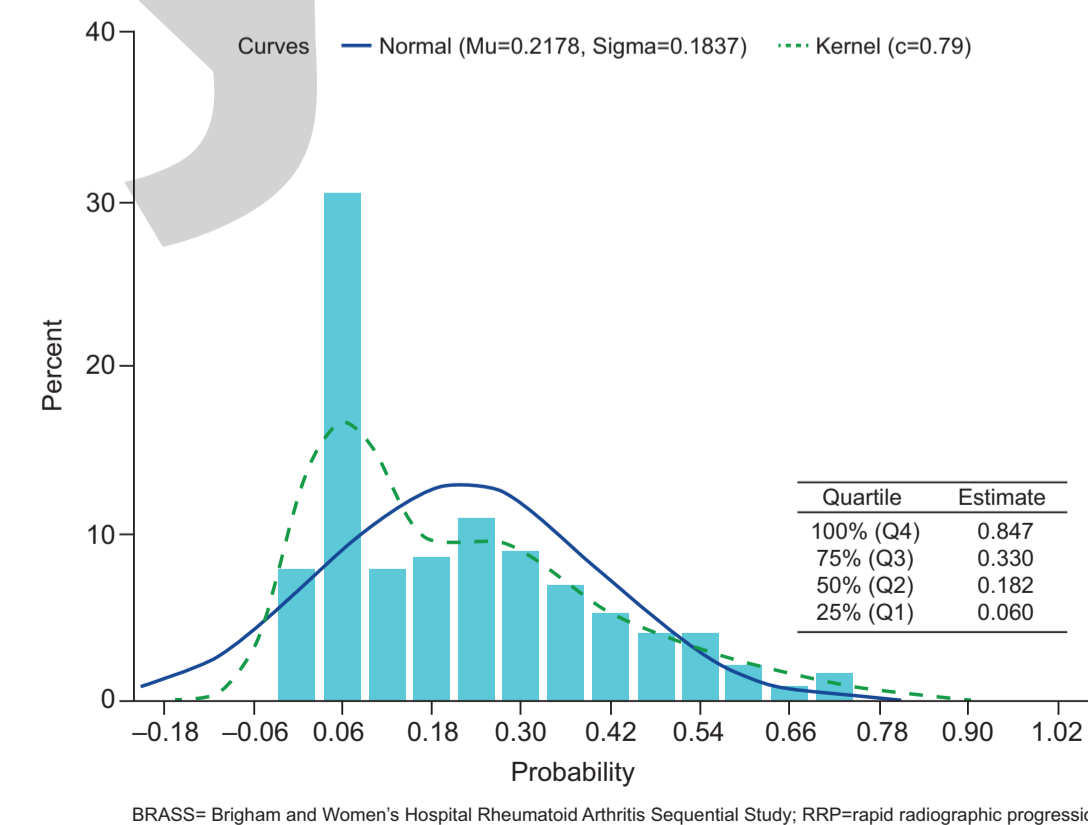### Figure 2. Distribution of Estimated Risk of RRP at Baseline in BRASS

Quartile	Estimate
100% (Q4)	0.847
75% (Q3)	0.330
50% (Q2)	0.182
25% (Q1)	0.060

BRASS= Brigham and Women's Hospital Rheumatoid Arthritis Sequential Study; RRP=rapid radiographic progression

Table 1. Baseline Characteristics of the Patients by RRP Category

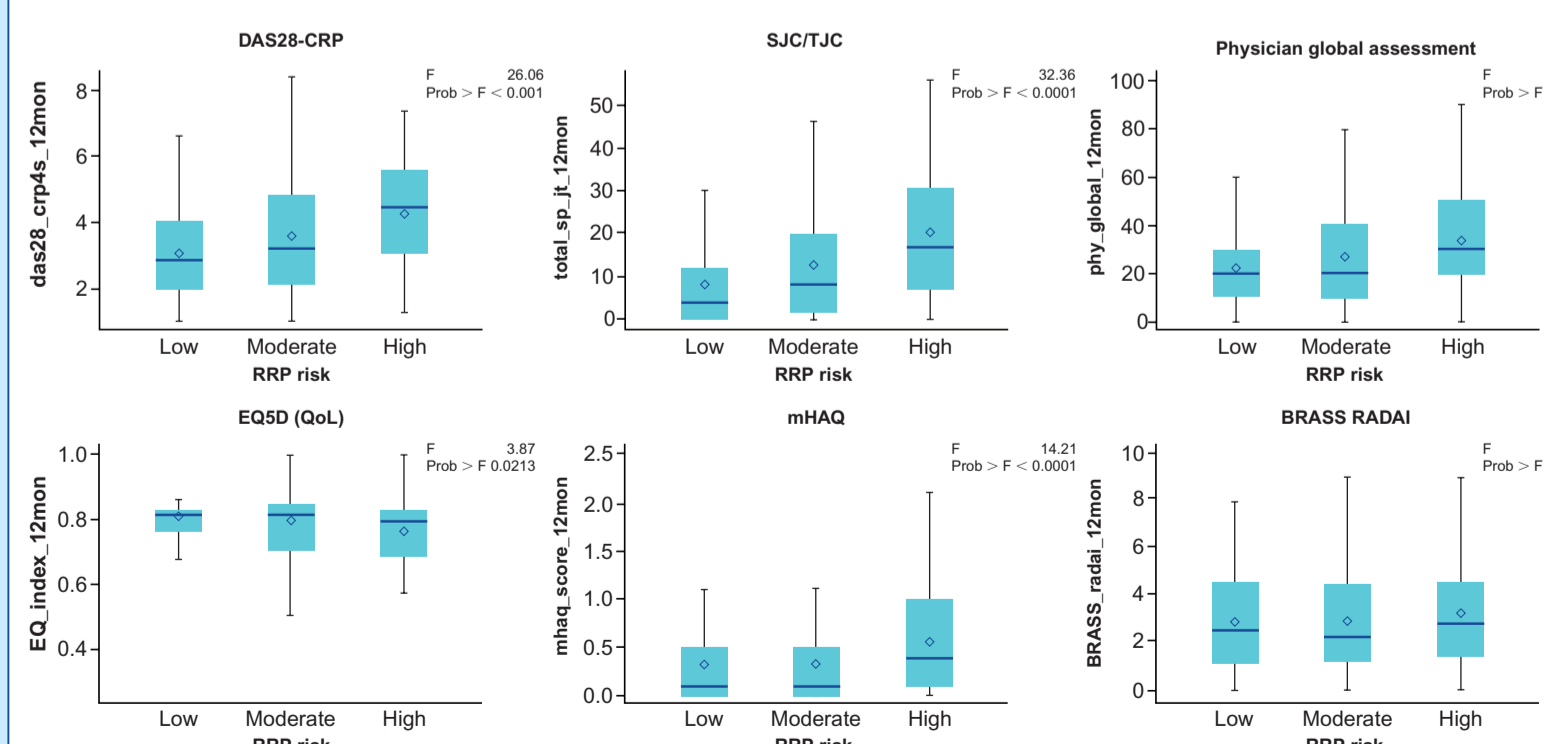| Characteristic	Low risk of RRP [0–0.1] (n=310)	Moderate risk of RRP [>0.1–0.4] (n=321)	High risk of RRP [>0.4] (n=126)
Age, years	55.5 (14.7)	55.4 (14.6)	63.6 (11.0)
Females, %	79.0	83.5	84.1
Weight, lbs	175.9 (41.6)	153.7 (32.7)	143.9 (25.5)
Duration of symptoms, years	11.9 (12.3)	15.7 (12.9)	28.2 (12.1)
Ever used bio DMARDs, n (%)	100 (32.3)	148 (46.1)	71 (56.4)
Ever used non-bio DMARDs, n (%)	278 (89.7)	306 (95.3)	122 (96.8)
Total TJC or SJC	12.0 (12.3)	16.2 (13.8)	29.6 (15.0)
BRASS RADAI	3.5 (2.2)	3.7 (2.3)	3.6 (2.3)
DAS28-CRP	3.6 (1.5)	4.0 (1.5)	5.3 (15.0)
mTSS	15.5 (22.0)	42.2 (49.8)	139.6 (58.4)
CRP, mg/dL	7.3 (18.1)	8.5 (13.3)	19.7 (37.3)
Anti-CCP U/mL	62.3 (110.9)	164.0 (136.9)	208.7 (121.8)
Anti-CCP positive, n (%)	97 (31.3)	266 (82.9)	124 (98.4)
RF positive, n (%)	74 (23.9)	286 (89.1)	126 (100)
Seropositive,* n (%)	105 (33.9)	307 (95.6)	126 (100)

Data shown as mean (SD) unless stated otherwise
*Seropositive included patients who were either RF or anti-CCP positive
BRASS=Brigham and Women's Hospital Rheumatoid Arthritis Sequential Study; CCP= cyclic citrullinated peptide; mTSS=modified total Sharp score; RADAI=Rheumatoid Arthritis Disease Activity Index; RRP=rapid radiographic progression

Table 2. Outcomes at 12 Months by RRP Category (Controlling for Baseline Covariates)

Outcomes	Mean difference in outcomes at 12 months between*:			
	High vs low baseline risk of progression	95% CI	High vs moderate baseline risk of progression	95% CI
SJC/TJC	11.82†	8.27, 15.38	7.09†	3.54, 10.63
Physician global assessment	11.78†	6.25, 17.31	6.58†	1.07, 12.10
DAS28-CRP	1.35†	0.93, 1.77	0.79†	0.37, 1.21
EQ5D (QoL)	−0.05†	−0.08, −0.01	−0.03	−0.06, 0.00
mHAQ	0.24†	0.16, 0.32	0.22†	0.14, 0.30
BRASS RADAI	0.40	−0.10, 0.89	0.39	−0.11, 0.88

*Higher values for all outcomes (except EQ5D) signify worse disease. For EQ5D higher values signify better QoL.
†p<0.05
BRASS=Brigham and Women's Hospital Rheumatoid Arthritis Sequential Study; mHAQ, modified Health Assessment Questionnaire; QoL, quality of life; RADAI=Rheumatoid Arthritis Disease Activity Index; RRP=rapid radiographic progression
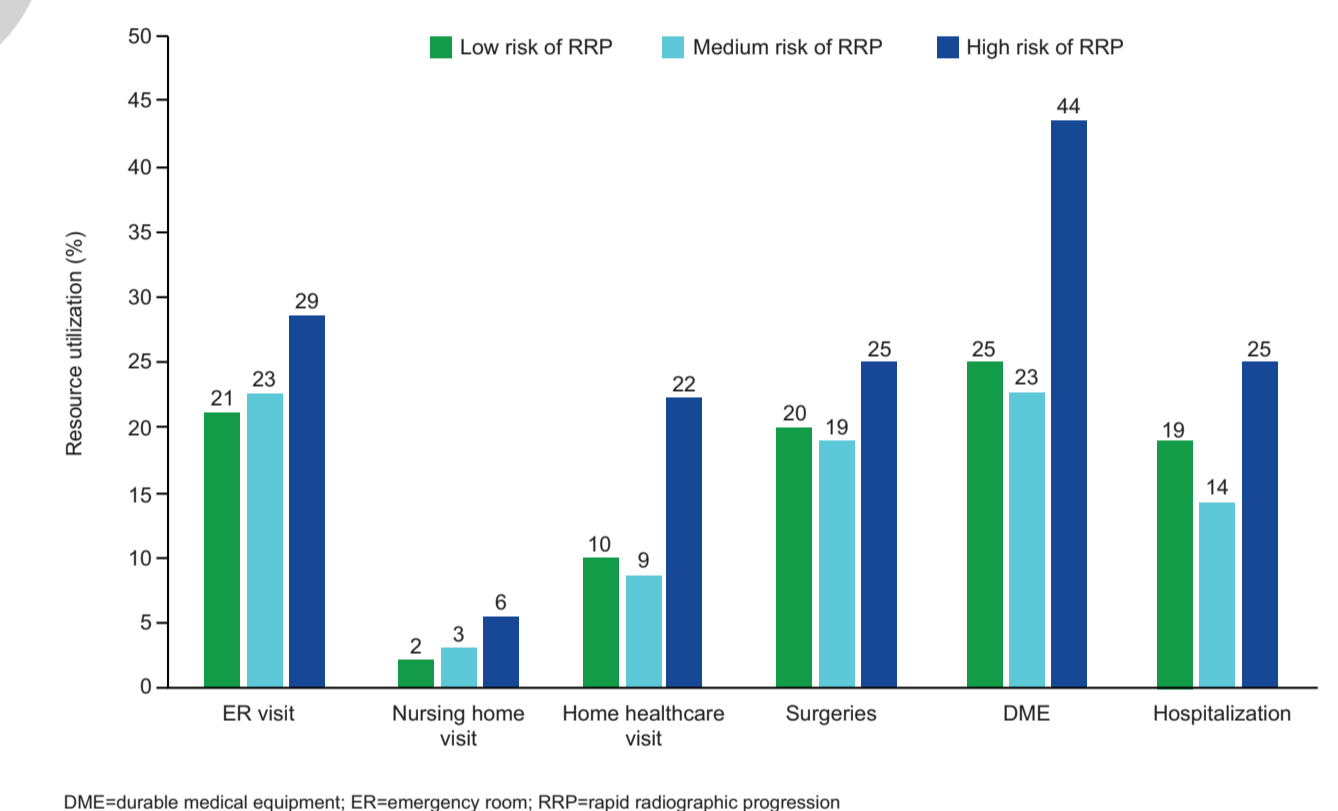
Figure 3. Clinical and QoL Outcomes at 12 Months by RRP Category

The horizontal lines in the boxes represent medians; diamonds represent means; top and bottom of the box represent third and first quartiles. The whiskers are the extreme values
BRASS=Brigham and Women's Hospital Rheumatoid Arthritis Sequential Study; mHAQ, modified Health Assessment Questionnaire; QoL=quality of life; RADAI=Rheumatoid Arthritis Disease Activity Index; RRP=rapid radiographic progression

- At baseline, patients in the low-risk group when compared with those in the moderate- and high-risk groups tended to be younger, have a lower number of swollen or tender joints, and less likely to be treated with a biologic DMARD (Table 1).
- At 12 months, patients at high baseline risk of RRP compared with those at low baseline risk of RRP had higher mean DAS28-CRP, SJC and TJC, physical global, QoL and mHAQ scores. When compared with the moderate-risk group, patients at high risk of RRP had higher mean scores in each of the above parameters except for QoL (Figure 3 and Table 2).
- Patients at high risk of RRP compared with those at low or moderate risk used more healthcare resources in terms of a greater proportion of patients having ER visits, nursing home visits, home healthcare visits, DME use, surgeries and hospitalizations (Figure 4).

Figure 4. Healthcare Resource Utilization at 12 Months by RRP Category

DME=durable medical equipment; ER=emergency room; RRP=rapid radiographic progression

CONCLUSION

- Patients classified as having high risk of predicted RRP when compared with those having moderate and low risk of RRP had poorer clinical and QoL outcomes, and higher healthcare resource use at 12 months.

REFERENCES

1. Alemao EA, et al. *Ann Rheum Dis* 2014;**73**(Suppl 2):603.
2. Weinblatt ME, et al. *Arthritis Rheum* 2013;**65**:28–38.
3. Schiff M, et al. *Ann Rheum Dis* 2014;**73**:86–94.

ACKNOWLEDGMENTS

DISCLOSURES