Construct validity of The Routine Assessment of Patient Index Data 3 (RAPID3) in the evaluation of axial spondyloarthritis

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Abstract

Background and aims: Although there are different tools to evaluate axial spondyloarthritis (axSpA), they are hardly used in clinical routine due to time constraints. The Routine Assessment of Patient Index Data 3 (RAPID3) is a composite measure feasible to be used as a sole metric in busy clinics. We aimed to test its measurement properties in patients with axial SpA in a real clinical setting.

Methods: Cross-sectional study that included 131 consecutive patients with axial SpA. The convergent (Spearman´s rho) and discriminant (ROC curve analysis) validity of RAPID3 were tested against several axSpA-specific measures (BASDAI, ASDAS, BASFI, mSASSS). A multivariate model was built to detect disease factors associated with RAPID3 remission (values ≤3).

Results: The study included 82 men and 49 women, median age of 55 years (IQR: 46-61), and median disease duration of 11 years (IQR: 6-24). Mean RAPID3 was 9.45 ± 6.7. The BASDAI showed moderate correlation with ASDAS (rho: 0.66, $p < 0.0001$), but higher with BASFI (rho: 0.78, $p < 0.0001$) and RAPID3 (rho: 0.75, $p < 0.0001$). The ASDAS had moderate correlations with BASFI, BASDAI, and RAPID3 (ranges from 0.66 to 0.68, $p < 0.0001$). Higher correlations were found between BASFI and BASDAI (rho: 0.78, $p < 0.0001$) and BASFI-RAPID3 (rho: 0.73, $p < 0.0001$). The m-SASSS did not show any correlation with any of the afore-mentioned composite measures. Kappa agreement between RAPID3 remission and other SpA remission criteria was moderate (*k:* 0.46-0.56). The RAPID3 thresholds to define remission ranged from values ≤2 to ≤ 6 with areas under the ROC curves between 0.86 and 0.91. Female sex (OR 0.34, 95%CI: 0.12-0.90, p= 0.031) and NSAIDs intake (OR 0.26, 95%CI: 0.10-0.66, p= 0.005) were independently associated with lower odds of achieving RAPID3 remission.

Conclusions: RAPID3 demonstrated construct validity in this cross-sectional study. This index can be useful for a more comprehensive assessment of axSpA in busy clinical settings.

Introduction

The concept of spondyloarthritis (SpA) encompasses diseases with common clinical and imaging features, along with a shared genetic base through HLA-B27. As a group, these diseases affect more than 1.5% of the general population, and as they affect mainly a young population, the direct and indirect costs associated with them are enormous (1-3). Spondyloarthritis may include diseases where the symptoms of joint pain and stiffness mainly affect the axial skeleton, as in ankylosing spondylitis (AS) and non-radiographic axial spondyloarthritis (nr-aSpA), together with other diseases, where these symptoms predominate in the peripheral joints, as is the case of psoriatic arthritis (PsA) (1). Be that as it may, these processes seriously compromise the physical function and quality of life (QoL) of patients (3).

Over decades, many instruments have been used to assess disease activity, physical function, movement metrics, or structural damage that accompanies SpA (4). Also, more recently, there has been a notable boost to investigations of instruments to capture the impact that these entities generate in the day-to-day life of these patients (5,6). Although all these tools provide information of undoubted value in clinical or therapeutic decision making, their use has become widespread mainly in the field of clinical trials or in the follow-up of large cohorts of patients with SpA (4). However, its penetration into clinical routine has been very uneven, and rather testimonial (4). The latter is surely due to the difficulty of using tools that are time-consuming, and that must be added to the metrics typical of other diseases treated in rheumatology clinics. For this reason, the search for reliable, simple, and easy to apply and interpret instruments continues to be a need not yet fully covered in the field of rheumatic disease metrology (4).

The Routine Assessment of Patient Index Data 3 (RAPID3) is an index composed of 3 patient self-reported measures: physical function, pain, and disease global assessment (7). RAPID3 shows sufficient reliability, simplicity, responsiveness, and applicability, as to cover a good part of the metrological needs in high-demand consultations (4,7). As it is a measure that includes relevant

outcomes and is little-time consuming, it meets the ideal conditions for its use as the sole metric in routine practice (4,7). Its good psychometric properties have been contrasted in different rheumatic diseases such as osteoarthritis, rheumatoid arthritis (RA), psoriatic arthritis (PsA), or axial SpA (axSpA), among others (4,7). Despite this, it is a measurement that, outside the field of RA, has hardly been used in real clinical practice. Therefore, more information is still needed on the added value of RAPID3 in rheumatic diseases other than RA. RAPID3 has shown good construct validity in both cross-sectional and longitudinal SpA studies (8-12). This way, it can be used as a comprehensive assessment measure in SpA. However, there is little information on its discriminant validity and on those factors associated with poor health according to the thresholds of this instrument. In the present study, we have analyzed both the convergent and discriminant validity of RAPID3 in patients with axSpA. We also aimed to investigate which disease factors are more likely to be associated with a state of remission according to RAPID3 cut-offs.

Patients and methods

This cross-sectional study included 131 consecutive patients with axSpA classified according to the 2009 ASAS criteria (13). The patients included were adults of both sexes who attended the rheumatology service of a regional hospital in northern Spain. The patients were informed of the objectives of the study and their informed consent was requested for their inclusion in it. Study period extended from June to December 2019. The study was approved by the clinical research ethics committee of the Palencia university healthcare complex (Nº Reg: 2020/035).

The study subjects were evaluated according to a study protocol in which socio-demographic, clinical, analytical, radiographic and treatment variables were collected. All patients were adults of both sexes. Data were collected on educational level, disease duration, family history of SpA and other rheumatic diseases, as well as the presence of comorbidities, especially of the cardiovascular type. Within the analytical parameters, erythrocyte sedimentation rate (ESR,

mm/h), C-reactive protein (CRP, mg/l), rheumatoid factor, antinuclear antibodies, and HLA-B27 were included, among others. The presence of enthesitis, dactylitis, uveitis, and inflammatory bowel disease was also included among study variables. All patients underwent a radiographic examination that included an anteroposterior (AP) projection of the pelvis, as well as AP and lateral views of the cervical and lumbar spine. The radiographic evaluation of structural damage was performed using the m-SASSS (modified-Stoke Ankylosing Spondylitis Spine Score), which includes evaluation from C2 to the upper part of T1 and from the lower part of T12 to the upper plateau of S1. The score range is 0-72, and the existence in vertebral corners of squaring, erosions, sclerosis, and/or syndesmophytes, are scored on lateral cervical and lumbar spine views (14). Structural damage in sacroiliac joints was evaluated by New York (NY) criteria (15).

Disease activity was evaluated with the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) (16) and the Ankylosing Spondylitis Disease Activity Score (ASDAS)-CRP (17). Physical function was assessed with the Bath Ankylosing Spondylitis Functional Index (BASFI) (18). A 44 joint count was used to evaluate peripheral arthritis. Although some metrics of axial skeleton movement were collected, a specific spinal metrology index was not determined in this study.

The clinimetric ability of RAPID3 to assess axSpA was the main objective of this study. RAPID3 is an index composed of 3 patient self-reported measures from the RA core data set: physical function on the Health Assessment Questionnaire (HAQ) or its multidimensional version (MDHAQ), along with pain and patient´s overall disease assessment on 2 visual analog scales (VAS; range 0–10) (7). In this study, physical function was assessed by the HAQ. The RAPID3 is calculated as the sum of its three domains, each domain reaching a maximum of 10 points, so that the range goes from 0 to 30. Severity categories have been defined for RA as follows: ≤3 for remission, 3.1–6.0 for low, 6.1–12.0 for moderate, and >12 for high severity (19). The same categories were used in this study.

Statistical methodology.

A descriptive statistical analysis of all the variables was performed, including central tendency and dispersion measures for continuous variables, and absolute and relative frequencies for categorical variables. For continuous variables, the goodness of fit for the normal distribution was verified by applying the Shapiro-Wilk test. In those variables with normal distribution, the mean with its 95% confidence interval (95%CI) and the standard deviation (SD) were used. The median and 25-75 percentile (p25-75 or IQR) was used in the case of variables that did not adjust to a normal distribution. Student t test, Mann-Whitney U test, or Kruskal-Wallis test were used to compare quantitative variables and Pearson's chi-square or Fisher's exact tests for qualitative variables. We examined construct convergent validity by correlating the scores of the RAPID3 against ASDAS-CRP, BASDAI, BASFI, and mSASSS. Spearman´s rho correlation coefficients were obtained to quantify these relationships. Correlations were interpreted as follows: very high (> 0.90), high (0.70–0.89), moderate (0.50–0.69), low (0.26–0.49), and poor or almost nil (≤ 0.25). To distinguish patients with active and non-active disease (discriminant validity) and to assess the RAPID3 respective cutoff values for that states, the receiver-operating characteristic (ROC) curve analysis was used. Cohen's kappa (*k*) statistic was used to assess the degree of agreement between the definitions of remission according to the ASDAS, BASDAI and RAPID3. A weighted *k* statistic was calculated between the 4 ASDAS activity categories and the 4 RAPID3 severity levels. Cohen's *k* concordance was considered as follows: < 0.20 = poor, 0.21–0.40 = fair, 0.41–0.60 = moderate, 0.61–0.80 = good, and 0.81–1.00 = very good. Multivariate analyses were performed to assess predictors of BASDAI remission (BASDAI sum score ≤2 plus acute phase reactants within the normal range), ASDAS inactive disease (ASDAS < 1.3), and RAPID3 remission. Statistical significance was set at p <0.05. Data were analyzed using SPSS V19.0 statistical software (IBM Corp.).

Results

This study included 131 patients, 82 men and 49 women, with a median age of 55 years (IQR: 46-61), and a median disease duration of 11 years (IQR: 6-24). Of the study population, 111 (84.7%) patients had radiographic axial disease, while the remaining 20 (15.3%) corresponded to nr-axSpA. One third of patients presented peripheral involvement (mostly asymmetric arthritis of the lower limbs). Only 3 and 6 patients had dactylitis and enthesitis, respectively. Anterior uveitis was diagnosed in 21 (16%) patients, while 19 (14.5%) patients had concomitant inflammatory bowel disease. HLA-B27 was determined in 122 patients, being positive in 60.7% of them. Upon study entry, 72 (55%) patients were taking NSAIDs, 40 (30.5%) were taking conventional synthetic DMARDs (mostly sulfasalazine), while 91 (69.5%) were receiving biological therapies (mostly TNF blockers). Table 1 shows the main characteristics of the study among men and women.

Of the 103 patients with radiographic axial disease, HLA B27 was positive in 72 (70%), p <0.001. On the other hand, 16 of the 19 patients (84.2%) with anterior uveitis were B27 positive, p = 0.016. However, we did not find a statistically significant association between this antigen and syndesmophytes formation.

Patients with radiographic structural disease were older [55.5 yr (11.9) vs. 47.6 yr (11.1), p= 0.006], with longer disease duration [15.3 yr (10.7) vs. 8.9 yr (6.8), p= 0.001], and logically showed higher mean m-SASSS values [15 (19.8) vs. 2.4 (4.0), p < 0.001], compared to subjects with nr-axSpA. However, patients with nr-axSpA showed higher mean values, both for BASDAI [5.3 (2.9) vs. 3.5 (2.3), p= 0.002] and RAPID3 [12.3 (6.4) vs. 9 (6.6), p= 0.04]. We did not find significant differences between both groups in terms of ASDAS or BASFI.

Mean BASDAI was 3.7 ± 2.5. For ASDAS, it was 2.06 ± 0.82. These values were 3.61 ± 2.5 and 9.45 ± 6.7 for BASFI and RAPID3, respectively. Convergent validity was moderate to high for RAPID3 in relation to other specific measures of axial SpA (Table 2/Figure 1a-1c). The BASDAI

showed moderate correlation with ASDAS (rho: 0.66, p < 0.0001), but higher with BASFI (rho: 0.78, p < 0.0001) and RAPID3 (rho: 0.75, p < 0.0001). The ASDAS had moderate correlations with BASFI, BASDAI, and RAPID3 (ranges from 0.66 to 0.68, p < 0.0001). Higher correlations were found between BASFI and BASDAI (rho: 0.78, p < 0.0001) and BASFI-RAPID3 (rho: 0.73, p < 0.0001). The m-SASSS did not show any correlation with any of the afore-mentioned composite measures.

Of the 131 patients, 41 (31.3%) achieved BASDAI remission, while 24 (18.3%) were in the ASDAS category of inactive disease [*k*: 0.46 (95%CI: 0.29-0.63)]. Kappa agreement [0.53 (95%CI: 0.37-0.69)] was better between BASDAI remission and RAPID3 remission (28.2%). Finally, the best agreement was found between ASDAS inactive disease and RAPID3 remission [*k*: 0.56 (95%CI: 0.39-0.72)]. However, when the 4 ASDAS activity categories were compared with the 4 RAPID3 severity levels, only a fair agreement was obtained with a weighted *k* of 0.34 (95%CI: 0.25-0.44).

Regarding the discriminant validity (Figure 2), the best cut-off of the RAPID3 to identify the inactive disease ASDAS category was ≤2, area under the ROC curve (AUC) 0.91, sensitivity (sen) 83.3%, specificity (spe) 88.8%, p < 0.0001. With respect to BASDAI remission, these values were as follows: optimal criterion ≤6, AUC 0.86, sen 78%, esp 86.7%, p < 0.0001. Table 3 shows the optimal RAPID3 criteria to identify the other categories of disease according to BASDAI and ASDAS.

Finally, a multivariate logistic regression was carried out to identify disease traits associated with remission states according to BASDAI, ASDAS, and RAPID3. For BASDAI remission, the only factor associated with this outcome was NSAIDs intake (OR 0.18, 95%CI: 0.07-0.49, p= 0.001). With respect to ASDAS inactive disease category, both NSAIDs (OR 0.08, 95%CI: 0.02-0.28, p< 0.0001) and DMARD (OR 0.19, 95%CI: 0.05-0.79, p= 0.023) exposure were negatively associated with this category. Regarding RAPID3 remission, women with axSpA were less likely to achieve this goal

(OR 0.34, 95%CI: 0.12-0.90, p= 0.031). Also, NSAID intake was negatively associated with this latter outcome (OR 0.26, 95%CI: 0.10-0.66, p= 0.005).

Discussion

In this study of patients with long-standing axSpA, the RAPID3, an instrument belonging to RA metrology, showed both good convergent and discriminant validity. Interestingly, the RAPID3 cutoff thresholds to discriminate remission by BASDAI and ASDAS were different, however, these cut-offs were similar for the high-activity categories of both instruments. Another relevant finding of this study is that NSAIDs intake was significantly and independently associated with the failure to achieve a state of remission according to the thresholds for this state of the three instruments. For their part, women were less likely to achieve RAPID3 remission. Of all the SpA-specific tools, the only one that did not correlate with the others was the m-SASSS. According to our results, it may be necessary to establish specific cut-off points for RAPID3, different from those set for RA, in subjects with axSpA, although this would require more studies. Therefore, as the analysis of construct validity demonstrated a good correlation between RAPID3 sum score and both disease activity and functional disability indices, the RAPID3 may be measuring a broader concept than just disease activity or functional disability.

Multiple SpA-related questionnaires have been developed to assess the disease status accurately, but feasibility remains a problem in clinical practice (4). The BASDAI remains the gold standard for assessing disease activity in a routine practice, despite poor correlation with CRP levels and MRI inflammation. On the other hand, ASDAS performs better than BASDAI in assessing disease activity, and correlates with MRI inflammation (4). However, it lacks feasibility as ESR and CRP values are often not available during a clinic visit, and these inflammatory markers are elevated only in 30-50% on patients (4). In addition, the BASFI may not be sufficiently sensitive to detect subtle changes in functioning in patients without severe impairments (4). Other less used instruments such as the ASAS health index or the BASMI are

time-consuming, need training, and may not be feasible in busy clinics (4). Therefore, although ASAS in collaboration with OMERACT developed a composite core set of variables to be measured for clinical, functional assessment, and monitoring of axSpA, in different clinical scenarios, most of these tools are difficult to implement in daily practice due to time constraints (4). Therefore, there is a continuous search for new instruments to measure health in patients with axSpA, which could be attractive and reliable in real clinical practice settings. RAPID3 could meet part of these expectations, however, as we will see below, in the last decade only 5 studies (indexed in PubMed) have been published on its usefulness in axSpA.

In a study by Michelsen et al. that compared the disease burden between RA, PsA, and axSpA, RAPID3 showed moderate to high correlations with DAS28 (rho = 0.521) and CDAI (rho = 0.768) in RA and PsA, and with BASDAI (rho = 0.902) and BASFI (rho = 0.865) in axSpA (8). Cinar et al. found that RAPID3 was strongly correlated with BASDAI and ASDAS-ESR (r = 0.842, r = 0.815; respectively). Among 209 patients with BASDAI high activity, 83.3 % had high or moderate severity according to RAPID3 (*k*: 0.69) (9). In a Korean AS population, Park et al. showed that RAPID3 scores were correlated significantly with BASDAI (ρ = 0.82) and ASDAS-ESR (ρ = 0.76). All 21 patients with BASDAI ≥4, were among 39 patients who had RAPID3 >12, whereas 79% of 33 patients with ASDAS >1.3, had RAPID3 high severity (10). Danve et al. demonstrated high discriminant ability for RAPID3 with respect to BASDAI activity categories (11). However, Castrejon et al. found that the strength of agreement of RAPID3 with ASDAS-CRP was moderate (*k*: 0.44) and lower with BASDAI (*k*: 0.37). Responsiveness over 6 months was slightly higher for ASDAS-CRP and RAPID3-like index than that for BASDAI (12). Our results (Spearman's rho ranged from 0.66 to 0.78, and *k* agreements ranged from 0.34 to 0.56) are in line with the data presented above, which reinforces its reliability. In the cited studies, no information was provided on the possible association between structural damage and RAPID3. We evaluated this point but found no correlation between m-SASSS and RAPID3. This was in some way an unexpected finding. However, we know from some reports that patients with structural damage

and long-lasting disease, who may be in clinical remission or low disease activity, may have a low disease impact. Therefore, it seems that structural damage is more closely related to disease impact and poor QoL in the short but not so in the long term (20).

Of all the factors analyzed, the one most consistently associated with failure to achieve remission, as defined by BASDAI, ASDAS, and RAPID3, was the regular intake of NSAIDs. This aspect has already been pointed out in the literature and forces us to rethink the place that these drugs should occupy in the treatment of these conditions (21). Regarding RAPID3 remission, our women with axSpA reduced by 66% their chance of being on that goal. It is known that women with axSpA tend to score higher for both pain and disease activity (22). However, our finding is especially interesting if we consider very recent data showing that women with AS had an increased risk of delivering infants requiring intensive care and that a high RAPID3 score was associated with a higher risk of cesarean delivery (23).

This study has limitations. This was a cross-sectional observation so RAPID3 responsiveness has not been determined. Neither have results been presented on internal consistency or reproducibility, although both aspects have been contrasted in other RAPID3 publications (7-12). We have also not contrasted the correlation between RAPID3 against enthesitis or axial metrology indices. Anyway, our results were consistent with those of previous studies thus reinforcing its robustness and validity.

In sum, RAPID3 offers a comprehensive estimate for an optimal evaluation of axial SpA in clinical routine. However, more studies are needed to endorse its role in this context.

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Figure 1 legend.

Graphs of correlations between RAPID3 and other axial SpA measures. The correlations were somewhat better between RAPID3 and BASDAI (1a) and RAPID3-BASFI (1b), compared to ASDAS-CRP (1c). See text for details.

RAPID3: routine assessment of patient index data 3, SpA: spondyloarthritis, BASDAI: Bath ankylosing spondylitis disease activity index, BASFI: Bath ankylosing spondylitis functional index, ASDAS-CRP: ankylosing spondylitis disease activity score-C-reactive protein.

Figure 2 legend.

Area under the ROC curve (AUC) of the RAPID3 thresholds to identify the categories of inactive disease of ASDAS-CRP and BASDAI remission. See text for details.

AUC: area under receiver-operating characteristic curve, ROC: receiver-operating characteristic curve, RAPID3: routine assessment of patient index data 3, ASDAS-CRP: ankylosing spondylitis disease activity score-C-reactive protein, BASDAI: Bath ankylosing spondylitis disease activity index.

Table 1. Disease characteristics among men and women in this study.

Variable	Men, n: 82	Women, n: 49	p-value
Age, yrs [mean (SD)]	54.7 (11.9)	53.6 (12.3)	NS
Disease duration, yrs [mean (SD)]	16.3 (11.2)	11.0 (8.3)	0.002
Education level			
- **Primary**	14.6%	8.1%	NS
- **Secondary**	73.2%	63.3%	NS
- **University**	12.2%	28.6%	0.02
CV comorbidity			
- **Tobacco**	25.6%	32.7%	NS
- **Obesity**	7.3%	8.2%	NS
- **Diabetes**	3.7%	8.2%	NS
- **Dyslipidemia**	18.3%	20.4%	NS
- **Hypertension**	19.5%	16.3%	NS
- **Hyperuricemia**	11.0%	2.0%	0.09
Disease pattern			
- **Axial**	70.7%	61.2%	NS
- **Peripheral joint involvement**	29.3%	38.8%	NS
Other SpA features			
- **Dactylitis**	1.2%	4.1%	NS
- **Enthesitis**	2.4%	8.2%	NS
- **Uveitis**	19.5%	10.2%	NS
- **IBD**	9.8%	22.4%	0.05
X-ray structural disease			0.001
- **Yes**	92.7%	71.4%	
- **No**	7.3%	28.6%	
Syndesmophytes	52.4%	20.4%	<0.0005
HLA-B27	50/76 (65.8%)	24/46 (52.2%)	NS
NSAIDs	53.7%	57.1%	NS
csDMARDs (%)	26.8%	36.7%	NS
Biologic therapy (%)	63.4%	79.6%	0.05
Inflammatory markers			
- CRP (mg/l), mean (SD)	2.8 (4.6)	2.9 (5.1)	NS
- ESR (mm/h), mean (SD)	5.8 (8.2)	9.0 (7.3)	0.03
Outcomes [mean (SD)]			
- **BASDAI**	3.1 (2.3)	4.8 (2.5)	0.0001
- **ASDAS-CRP**	1.9 (0.9)	2.2 (0.7)	0.07
- **BASFI**	3.4 (2.5)	4.0 (2.3)	NS
- **RAPID3**	8.2 (6.7)	11.5 (6.3)	0.005

yrs: years, SD: standard deviation, CV: cardiovascular, SpA: spondyloarthritis, IBD: inflammatory bowel disease, HLA: human leukocyte antigen, NSAIDs: non-steroidal anti-inflammatory drugs, csDMARDs: conventional-synthetic disease modifying anti-rheumatic drugs, CRP: C-reactive protein, ESR: erythrocyte sedimentation rate, BASDAI: Bath ankylosing spondylitis disease activity index, ASDAS: ankylosing spondylitis disease activity score, BASFI: Bath ankylosing spondylitis functional index, RAPID3: routine assessment of patient index data 3.

Note: X-ray structural disease refers to the presence of sacroiliitis according to NY criteria with/without spinal involvement.

Table 2. Spearman's rho correlation coefficients between the different outcome measures of this study.

	m-SASSS	BASDAI	ASDAS-CRP	BASFI	RAPID3
m-SASSS		rho: -0.17 p: 0.054	rho: -0.11 p: 0.19	rho: 0.07 p: 0.42	rho: -0.10 p: 0.23
BASDAI	rho: -0.17 p: 0.054		rho: 0.66 p< 0.0001	rho: 0.78 p< 0.0001	rho: 0.75 p< 0.0001
ASDAS-CRP	rho: -0.11 p: 0.19	rho: 0.66 p< 0.0001		rho: 0.68 p< 0.0001	rho: 0.66 p<0.0001
BASFI	rho: 0.07 p: 0.42	rho: 0.78 p< 0.0001	rho: 0.68 p< 0.0001		rho: 0.73 p<0.0001
RAPID3	rho: -0.10 p: 0.23	rho: 0.75 p< 0.0001	rho: 0.66 p<0.0001	rho: 0.73 p<0.0001	

m-SASSS: modified-Stoke ankylosing spondylitis spine score, BASDAI: Bath ankylosing spondylitis disease activity index, ASDAS-CRP: ankylosing spondylitis disease activity score-C-reactive protein, BASFI: Bath ankylosing spondylitis functional index, RAPID3: routine assessment of patient index data 3

The correlations are significant at the 0.01 level (bilateral).

Table 3. Optimal cut-off thresholds of RAPID3 to identify activity categories other than remission according to ASDAS and BASDAI.

	RAPID3 optimal criterion	AUC (95%CI)	Sensitivity	Specificity	p-value
BASDAI LDA	≤10.7	0.86 (0.77-0.92)	75%	86.2%	<0.0001
ASDAS LDA	≤10.7	0.75 (0.66-0.83)	65.2%	73.8%	<0.0001
BASDAI HDA	>10.7	0.89 (0.83-0.94)	86.2%	84.9%	<0.0001
ASDAS H/vHDA	>10.7	0.82 (0.75-0.88)	73.8%	77.1%	<0.0001

BASDAI: Bath ankylosing spondylitis disease activity index, LDA: low disease activity, ASDAS: ankylosing spondylitis disease activity score, HAD: high disease activity, H: high, vHDA: very-high disease activity, RAPID3: routine assessment of patient index data 3, AUC: area under receiver-operating characteristic curve. CI: confidence interval.

BASDAI LDA: >2 - <4, ASDAS LDA: >1.3 - <2.1, BASDAI HDA: ≥4, ASDAS H/vHDA: ≥2.1

Figure 1a

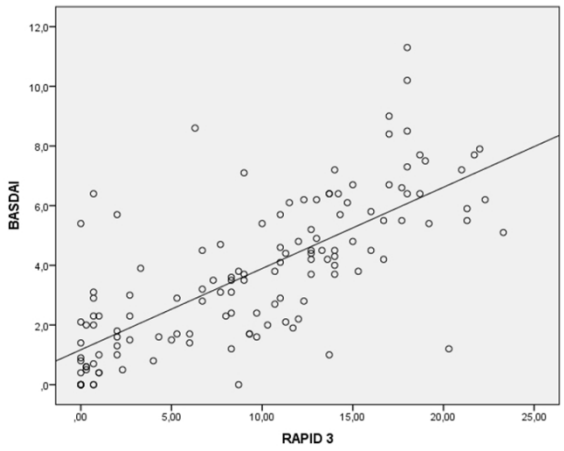


Figure 1a

338x190mm (96 x 96 DPI)

Figure 1b

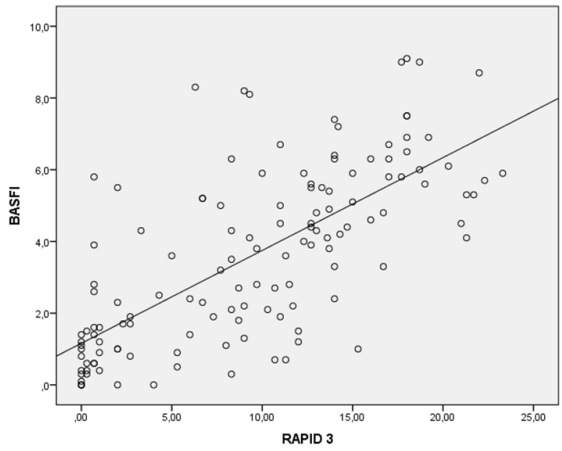


Figure 1b

338x190mm (96 x 96 DPI)

Figure 1c

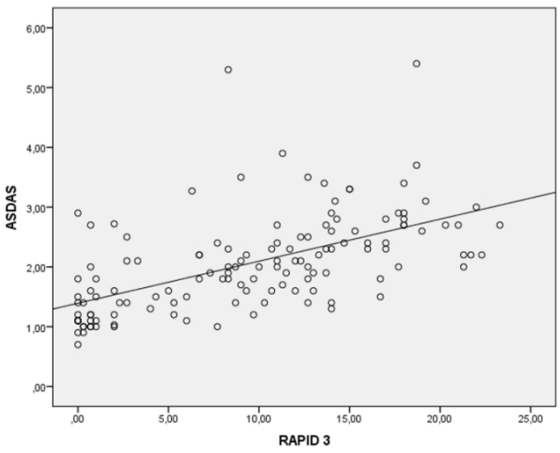
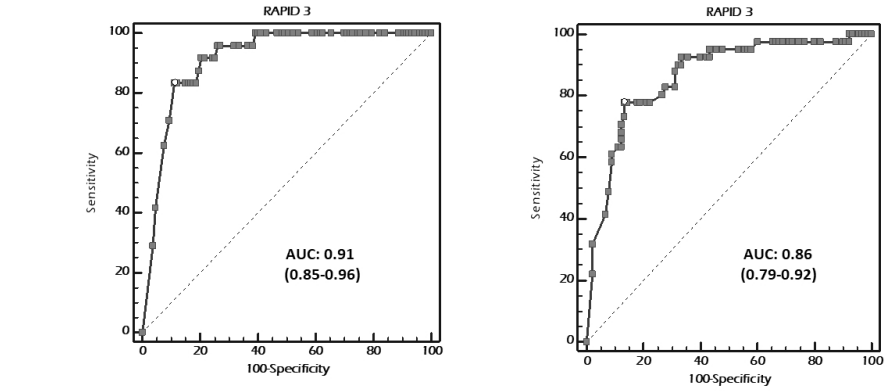


Figure 1c

338x190mm (96 x 96 DPI)

Figure 2



ASDAS-CRP inactive disease (< 1.3)

BASDAI remission (≤ 2)

Figure 2

338x190mm (96 x 96 DPI)