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A comparison between the simplified erosion and narrowing score and the Sharp-van der Heijde score

A post hoc analysis from the BeSt study


Ann Rheum Dis 2011; 70: 714-716
The Sharp-van der Heijde method (SHS; range 0-448) is an often used and well-validated method to assess joint damage on x-rays in rheumatoid arthritis (RA). It is a comprehensive method that requires training, making it less feasible for clinical practice. The simplified erosion and narrowing score (SENS, range 0-86) scores the same joints as SHS, but without grading of damage per joint, making it quicker and easier to learn. Using SENS takes 7 minutes for seven sets of radiographs, compared with 25 minutes for seven sets using SHS.

In earlier studies, SENS showed good reliability and responsiveness, but these studies either had no restrictions in disease duration or limited patient numbers. We aimed to compare the properties of SENS and SHS in a large group of early, intensively treated RA patients with limited joint damage during 5 years of follow-up in the BeSt (Behandel Strategieën [Treatment Strategies]) study. Details of the study have been described earlier.

Annual radiographs of hands and feet in years 0-5 were scored in one session per patient in random time sequence using SHS by two independent readers blinded for patient identity. Per reader, the SENS was derived from the SHS. In total, 2595 sets of radiographs were present from 498 patients (mean 5.2 sets per patient). Median (IQR)/mean (SD) SHS and SENS at baseline were 3.0 (0.5-9.5)/7.1 (10.2) and 2.0 (0.5-5.5)/3.8 (4.7), respectively. Mean SHS progression in year 1-5, respectively, was 3.4, 1.5, 1.1, 1.5, 1.6; mean SENS progression was 1.7, 0.6, 0.4, 0.5, 0.6.

The reliability of SENS was comparable to SHS with moderate to high between-reader intra-class correlation coefficients (ICCs). Between-reader ICCs for total SHS and SENS varied between 0.74 and 0.93 for both methods. For progression from baseline, between-reader ICCs varied between 0.90 and 0.95 without differences between the methods and was stable over time.

SENS had lower absolute progression scores than SHS, as expected inherent to the scale (figure 1). In most patients, positive SHS change scores were accompanied with positive SENS change scores. However, the figures illustrate that in patients with large SHS progression the amount of SENS progression is highly variable. Percentages with progression ≥1 unit were higher for SHS than for SENS (tables 1 and 2). Sensitivity varied between 69 and 89%, and specificity was high (94-99%). Comparable results were observed for progression ≥ the smallest detectable change. In year 1 (delta 0-1) and year 5 (delta 4-5) (B). Reader 2 showed comparable results (data not shown).
Table 11.1

<table>
<thead>
<tr>
<th>SDC (of maximum score)*</th>
<th>% progression ≥ SDC</th>
<th>% discordance ≥ SDC</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>delta 1-0</td>
<td>28 (1.8)</td>
<td>10% (86/830)</td>
<td>86% (86/100)</td>
<td>97%</td>
</tr>
<tr>
<td>delta 2-1</td>
<td>24 (1.8)</td>
<td>9% (101/1014)</td>
<td>90% (101/111)</td>
<td>88%</td>
</tr>
<tr>
<td>delta 3-2</td>
<td>22 (1.8)</td>
<td>11% (111/1014)</td>
<td>86% (111/127)</td>
<td>90%</td>
</tr>
<tr>
<td>delta 4-3</td>
<td>20 (1.8)</td>
<td>9% (101/1014)</td>
<td>90% (101/111)</td>
<td>95%</td>
</tr>
<tr>
<td>delta 5-4</td>
<td>18 (1.8)</td>
<td>10% (101/1014)</td>
<td>90% (101/111)</td>
<td>95%</td>
</tr>
</tbody>
</table>

SDC, smallest detectable change; SENS, simplified erosion and narrowing score; SHS, Sharp-van der Heijde score.

Values are percentages (n/n), except for SDC.

*SDC (values in parentheses are percentage of maximum score of SHS and SENS in the study, that is, 236 and 64 for SHS and SENS, respectively)

Comparing responsiveness of SENS and SHS, which was the main focus of our analysis. Furthermore, earlier research showed that the concordance between SENS scored separately versus SENS derived from SHS was high (93.8% complete agreement)².

In summary, SENS is a valuable tool in clinical practice due to its time efficiency. However, we do not recommend SENS for research, because it is less sensitive, and by disregarding grading of damage per joint the discriminative power will be lower.

REFERENCES