Comparative Analysis of Different Specific Indices of Hand Impairment in Systemic Sclerosis

To the Editor:

Hand involvement is often the first clinical manifestation of systemic sclerosis (SSc) during the disease course. Some indices such as finger-to-palm distance in flexion (FTP)\(^1\), the Hand Anatomic Index (HAI)\(^2\), and the Hand Mobility in Scleroderma test (HAMIS)\(^3\) have been developed to assess functional impairment by testing the reduction in range of motion or evaluating inability, but there is still no consensus whether they yield different information or are mutually interchangeable.

We compared these 3 assessment tools used to quantify hand impairment in SSc, considering their associations with organ involvement.

Our analyses were based on 80 consecutive patients with SSc (68 women, 12 men) referred to the Division of Rheumatology, Istituto Gaetano Pini, Milan; 60 were classified as having limited cutaneous disease (lcSSc; mean age 61.3 yrs) and 20 as having diffuse cutaneous disease (dcSSc; mean age 58.9 yrs). Judged from the first symptom attributable to SSc, 20 (33.3%) lcSSc and 6 (30%) dcSSc patients had disease of recent onset (< 5 and 3 years, respectively), whereas 40 (66.7%) lcSSc and 24 (70%) dcSSc patients had intermediate/late onset disease (≥ 5 and 3 years)\(^4\).

To determine patients’ disease profiles on the basis of the pattern of organ involvement (lung, esophagus, cardiac, renal, and hand involvement) assessed for the study, we used cluster analysis, a technique that allows patients with clinically similar characteristics to be ordered into different homogeneous groups (or clusters). In general, patients in Group B showed more organs involved and hand impairment than patients in Group A (Table 1)\(^4\).

As 2 groups were identified, the probability of major organ involvement (Group B) on the basis of hand measures was investigated by logistic regression. The discriminating ability of each model (consisting of a single index or different combinations of the indices) was computed using the area under the receiver-operating characteristic (ROC) curve with a 95% bootstrap confidence interval and 1000 bootstrap resamples.

Moreover, in order to evaluate the discriminating ability of the indices in classifying patients, the best cutoff point for each ROC curve was calculated as the values corresponding to the highest sum of sensitivity and specificity.

Table 2 shows the area under the ROC curve (C-index) for each model, together with its confidence interval, the best cutoff point, and the corre-
sponding sensitivity and specificity. HAMIS and HAI showed good discriminating ability, although if the confidence intervals are taken into account, the results of all the models were similar and suggest that the combined use of 2 or 3 indices does not increase their discriminating capacity with respect to organ involvement. Overall, the results suggest an interesting association between severity of hand involvement and severity of organ involvement.

In terms of the putative best cutoff points to discriminate patients with major extent of organ involvement, HAMIS was the most specific (89%); HAI showed good sensitivity and specificity. The combined use of the 3 indices led to greater sensitivity, suggesting that patients could be excluded from the group with major extent of organ involvement if HAMIS is < 4.5, HAI > 2.6, and FTP > 0.5. The suggested cutoff points obtained on the basis of the ROC curves are only intended to illustrate potential severity criteria and are not for use in clinical practice.

As the 3 indices showed comparable capacity to discriminate both alone and together, their use in clinical practice may be based on practical considerations, i.e., ease of administration and scoring, training, and completeness.

The HAI measures hand deformity, which in SSc patients is due to flexural contractures and joint immobility2,6. Although the HAI has been validated in SSc, its use in clinical practice may be limited by the fact that it requires some training and no clear cutoff point has yet been established. Moreover, Roberts-Thomson, et al7 have recently proposed a modified version (mHAI) derived from an equation that seems to require further measurement skills, and may therefore be less suitable for practical, rapid, and standardized hand impairment assessments.

Our findings also showed that the HAMIS score correlates with SSc with extent of major organ involvement. HAMIS is a performance-based test that explores wrist and finger motion. As it includes items covering the most frequent and specific impairments seen in SSc, it is useful for monitoring specific occupational and physical therapy programs8.

Finally, FTP is widely used1,9 because it is an easy, rapid, and valid method of measuring finger joint contracture in systemic sclerosis [abstract]. Arthritis Rheum 2008;58 Suppl:S827.

Although HAI and FTP show the best discriminating ability, a combination of HAMIS and FTP (or delta FTP) may be the most practical means of assessing hand impairment in patients with SSc. Our findings agree with the hypothesis that the seriousness of hand involvement reflects the extent of organ involvement.

REFERENCES

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