Impairment of Grip Function in Rheumatoid Arthritis – Studies with a Simple Hand Test

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A new, simple and quick method for assessment of impaired grip function was evaluated in a rheumatology department. 208 of 211 patients with definite rheumatoid arthritis were unable to do the test, 48 of these patients had regarded their hands as unaffected when questioned. The impairment of grip function was closely related to clinical and functional observations but not related to the most common laboratory tests. The study confirms the hypothesis that almost all patients with RA are unable to do the hand test, even those who consider their hand function as normal.

Key words: Rheumatoid arthritis, Grip function, Hand test.

INTRODUCTION

The grip function of the hand is of great importance in professional and daily-life activities (1). Rheumatoid arthritis (RA) often affects the hands first and hand function may be severely impaired (2,3,4,5,6). Early detection of hand affection may result in an earlier diagnosis and initiation of adequate treatment (7). A joint index developed for the evaluation of disease progression in RA (8) has been simplified to produce a simple, easy and fast test for normal hand function to be used in primary health care (9,10). The hand test by Recht is based on the three main consequences of inflammation: pain, impaired movement and reduced grip power.

The test consists of a closed hand grip, a four finger grip and a pincer grip. Sollerman (11) has shown that these three grips or a combination of them are used in 97% of all activity of daily life tasks. The Recht test is an epidemiological tool with a very high sensitivity for RA, but the specitivity is low – all types of hand impairment are revealed (12,13). We have used this qualitative screening test to examine the presence of hand impairment in patients with definite RA already known to a rheumatology department. Our aim was to estimate the prevalence of hand impairment in RA patients, to evaluate the reliability of the patients' subjective statements of hand affection, and to correlate the hand test results to clinical and laboratory findings.

MATERIALS AND METHODS

211 patients (65 men and 146 women, median age 60 years) with definite RA according to the 1958 ARA criteria (14), seen at the Rheumatology department in Gråsten in a 3 months period in 1985, were tested with a simple hand test. Patients in whom a systemic steroid treatment was started or stopped less than one month before the test were excluded. The hand test consisted of three grips (Fig. 1). 1) A firm closed grip around the examiner's hand with full contact of all distal phalanges. 2) A four finger grip with the second to fifth finger fully extended in the metacarpophalangeal joints and holding a pencil firmly against a pincer

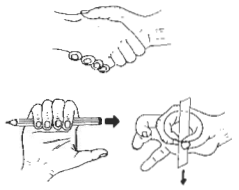

Fig. 1. The three elements of the hand test; a closed hand grip, a four finger grip around a pencil and a round pincer grip around a piece of paper.

grip pull from the observer, and 3) a round pincer grip with the tips of the first and second finger holding a piece of paper against a moderate pull from the observer. The test was performed on both hands, and each grip was scored for mobility, subjective power and pain, giving a total of 18 elements. The test was graded from 0 to 3, where 0 represented a normal grip function equal to a negative hand test. Grade 1 to 3 indicated that one, two or three of the modalities: mobility, force and pain, were affected simultaneously in a patient, but not necessarily in the same grip or hand. Before the test the patients were questioned about subjective impression of hand dysfunction, ability to perform the activities of daily living (ADL score) (15), working ability and duration of morning stiffness.

Finally a clinical examination recorded synovitis in hands, rheumatoid nodules, rheumatoid hand deformities and Steinbrocker score (16). Hand deformity were defined as: ulnar deviation, subluxations, hyperextension and flexion contractures like swan neck and boutonnière deformity in a minimum of one joint. ESR and serum haptoglobin were measured and age, sex and diagnosis were recorded from the patients files. All patients had an X-ray examination of their hands and a Waaler-Rose sheep cell agglutination test (SCAT) taken within one month. X-ray erosions were rated positive if any hand joint had a Larsen score of 2 or more (17). SCAT was rated positive in a titer of 40 or more. The graduation of the hand test is not a genuine rank, as two affected modalities are not necessarily worse than one, e.g. reduced movement and force compared to pain. We have therefore used the Chi square tests instead of a rank sum test. We have however tested the individual modalities e.g. pain as a rank sum test with the number of grips affected ranging from 0 to 6. The p-values in Table 1 have been corrected by multiplying by the number of variables examined (eleven).

RESULTS

We found a positive response to the hand test in 208 of the 211 patients with definite RA (98.6%). 48 patients had a positive hand test, despite statements of unaffected hands, and of these patients 42 had X-ray erosions, 8 had synovitis in the hands and 22 had hand deformities. Of the three RA patients with a negative hand test, one had stated hand impairment and two were free of hand symptoms. Significant positive correlations were observed with: the presence of synovitis in hands, hand deformity, X-ray erosions in hands, long duration of morning stiffness, reduced working ability and reduced physical function measured as ADL and Steinbrocker scores. There were no significant correlations with the laboratory test ESR, serum haptoglobin and SCAT titer or with the presence of rheumatoid nodules (Table I). Similar correlations were found when hand function was assessed by counting affected grips, (see methods).

Table I. *Graduated hand test in relation to clinical parameters in patients with definite RA.*

	Degree of positive hand test				Statistics	
	0	1	2	3	Chi2	p
Total no. of RA ptt.	3	19	32	157		
Synovitis in hands	0	3	4	89	30.99	0.005
Hand deformity	1	0	13	106	33.99	0.005
Nodules	1	5	8	63	3.64	NS
Morning stiffness > 1 h.	0	7	5	100	29.12	0.005
ADL score > 1.00	0	6	16	99	10.93	0.005
Steinbrocker score > 3	0	1	10	69	13.44	0.005
Inability to work	0	6	16	127	35.69	0.005
ESR > 20	2	12	22	109	6.85	NS
s Haptoglobin > 3.0	0	5	16	64	3.65	NS
Erosions in hands	2	11	30	143	20.04	0.005
SCAT-titer > 40	0	8	13	42	2.94	NS

Mediantest with Chi square f = 1 NS = non significant

DISCUSSION

The test was designed as a screening tool for RA and constructed to be very sensitive, but not specific for RA. It is not a test of ADL, but a triple grip test sensitive to hand impairment. In a previous study only 2 of 327 test persons without known hand affections were unable to perform this simple hand test, while none of 63 patients with known inflammatory hand disease could perform it, so the validity requirements are satisfactory (12). A study of a defined population of 5262 persons aged 40 to 70 years with the hand test as a self test tool found a total prevalence of hand impairment of 13 % , and the screening procedure identified 48 individuals with a previously unrecognized inflammatory joint disease (18). The hand test is highly reproducible in RA patients. The reliability is high or acceptable for all parts of the test and most important, the combined test shows a high ability to discriminate healthy hands from sick (12). An important finding in our study is that one fourth of the patients with hand impairment were unaware of their hand affection and would therefore fail to state it in an interview. One possible explanation is that patients with chronic inflammatory joint disease often learn to live with their handicaps and in time do not regard deformities or joint swelling as a problem. The hand impairment seems independent of the present disease activity measured biochemically with ESR or serum haptoglobin, a result corresponding with the observations of Spiegel et al. (19).

The ability of the test to disclose hand impairment in our patients was good (98%) which may indicate that the sensitivity of the test is good and that the prevalence of hand impairment in RA is very high. In a screening procedure there is no need to test patients who have already realized their problem, and the test revealed only one case of "false positive" statement of hand impairment. In these patients with definite RA, an investigation with the simple hand test supported by a question regarding hand affections would have found 99% of the RA cases, as 161 were aware of their hand impairment and additionally 48 had a positive hand test; 44 of these 48 were revealed by the four finger grip, so this grip alone supported by a question of hand affection could find 97% in a screening for RA. The hand test by Recht, and especially the fully extended four finger grip, can be of value in the early detection of RA in patients with a slowly progressing hand impairment. Since these are often without subjective hand symptoms they may be detected late and a secondary prevention of

handicap caused by the inflammatory joint disease is postponed. Measurement of the biochemical activity in combination with a question to the patient about hand problems, are not sufficient to find a slowly progressing hand affection.

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