Sensitivity and specificity of the American College of Rheumatology 1987 criteria for the diagnosis of rheumatoid arthritis according to disease duration: a systematic literature review and meta-analysis

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ABSTRACT

Objective: To evaluate the ability of the widely used ACR set of criteria (both list and tree format) to diagnose RA compared with expert opinion according to disease duration.

Methods: A systematic literature review was conducted in PubMed and Embase databases. All articles reporting the prevalence of RA according to ACR criteria and expert opinion in cohorts of early (<1 year duration) or established (>1 year) arthritis were analysed to calculate the sensitivity and specificity of ACR 1987 criteria against the "gold standard" (expert opinion). A meta-analysis using a summary receiver operating characteristic (SROC) curve was performed and pooled sensitivity and specificity were calculated with confidence intervals.

Results: Of 138 publications initially identified, 19 were analysable (total 7438 patients, 3883 RA). In early arthritis, pooled sensitivity and specificity of the ACR set of criteria were 77% (68% to 84%) and 77% (68% to 84%) in the list format versus 80% (72% to 88%) and 33% (24% to 43%) in the tree format. In established arthritis, sensitivity and specificity were respectively 79% (71% to 85%) and 90% (84% to 94%) versus 80% (71% to 85%) and 93% (86% to 97%). The SROC meta-analysis confirmed the statistically significant differences, suggesting that diagnostic performances of ACR list criteria are better in established arthritis.

Conclusion: The specificity of ACR 1987 criteria in early RA is low, and these criteria should not be used as diagnostic tools. Sensitivity and specificity in established RA are higher, which reflects their use as classification criteria gold standard.

Rheumatoid arthritis (RA) is a systemic autoimmune disease with a prevalence of around 1% of the population. It is characterised by chronic inflammation of the synovial joints which leads to progressive joint erosions and eventually to disability and loss of quality of life. This poor prognosis has led to an emphasis on rapid introduction of aggressive treatment by disease-modifying antirheumatic drugs. For this purpose, it is important to have diagnostic criteria which could, at an early stage of the disease, determine the diagnosis of RA, thus allowing rapid introduction of these drugs.

Compared with classification criteria, which at a late stage of disease can diagnose a disease with great specificity at the group level, diagnostic criteria should be able to diagnose a disease at an early stage with greater sensitivity. Classification criteria are developed for clinical research in the field of rheumatology (where a patient with rheumatic disease must be optimally classified from patients in a rheumatology outpatient clinic), or epidemiological studies (where a rheumatic patient must be classified from among a large population comprising healthy subjects). Diagnostic criteria are developed for a diagnostic situation (ie, to help the clinician reach a diagnosis when confronted with a given patient in an outpatient clinic). The objectives but also the development process of these types of criteria are thus very different.

To date, no such diagnostic criteria have been largely validated in RA. A few sets of criteria constructed for diagnosis have been proposed, but they have not been externally validated and are not widely used. The main criteria used in RA are the American College of Rheumatology (ACR) or American Rheumatism Association 1987 revised criteria, published by Arnett et al. Although these criteria were developed as classification criteria, they are widely used for diagnosis. The ACR 1987 criteria for RA can be applied in list format (patients are required to satisfy at least four of seven components of the criteria list) as reported in table 1 or in a decision-tree format as reported in fig 1. These criteria are described in the initial article as simple, sensitive and specific, and were found to be as good as, or better than, earlier criteria. However, the ACR 1987 classification criteria are not best adapted to diagnose RA at an early stage for several reasons; these criteria were not developed for diagnostic purposes and some of the criteria are rarely fulfilled in the first year after the onset of RA and may therefore lack sensitivity in early RA.

Notwithstanding these theoretical limitations, the ACR criteria are, in practice, widely used for diagnosis, although data regarding their diagnostic capacity are limited. Furthermore, the situation is clearly different in early RA than in established RA. The objective of this study was to assess through a systematic literature review, the diagnostic capacity (sensitivity and specificity) of the ACR 1987 RA classification criteria, for the diagnosis of RA, according to disease duration, and to perform a meta-analysis of these diagnostic capacities by receiver operator curves.

METHODS

A systematic review of the published literature following the Cochrane Collaboration recommendations was performed.