



Original Article

Association Between Body Composition and Inflammatory Activity in Rheumatoid Arthritis. A Systematic Review[☆]



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ABSTRACT

Background: Reports regarding the association between body composition and inflammatory activity in rheumatoid arthritis (RA) have consistently yielded contradictory results.

Objective: To perform a systematic review on the association between overweight/obesity and inflammatory activity in RA.

Methods: FAST approach: Article search (Medline, EBSCO, Cochrane Library), followed by abstract retrieval, full text review and blinded assessment of methodological quality for final inclusion. Because of marked heterogeneity in statistical approach and RA activity assessment method, a meta-analysis could not be done. Results are presented as qualitative synthesis.

Results: One hundred and nineteen reports were found, 16 of them qualified for full text review. Eleven studies (8147 patients; n range: 37–5161) approved the methodological quality filter and were finally included. Interobserver agreement for methodological quality score (ICC: 0.93; 95% CI: 0.82–0.98; $P < .001$) and inclusion/rejection decision (k 1.00, $P > .001$) was excellent. In all reports body composition was assessed by BMI; however a marked heterogeneity was found in the method used for RA activity assessment. A significant association between BMI and RA activity was found in 6 reports having larger mean sample size: 1274 (range: 140–5161). On the other hand, this association was not found in 5 studies having lower mean sample size: 100 (range: 7–150).

Conclusions: The modulation of RA clinical status by body fat mass is suggested because a significant association was found between BMI and inflammatory activity in those reports with a trend toward higher statistical power. The relationship between body composition and clinical activity in RA requires be approached with further studies with higher methodological quality.

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Asociación entre composición corporal y actividad inflamatoria en artritis reumatoide. Una revisión sistemática

RESUMEN

Introducción: Los estudios respecto a la asociación entre composición corporal y actividad inflamatoria en artritis reumatoide (AR) muestran resultados contradictorios.

Objetivo: Realizar una revisión sistemática de la literatura sobre la asociación entre sobrepeso/obesidad y nivel de actividad inflamatoria en AR.

Metodología: Enfoque FAST: búsqueda (Medline, EBSCO, biblioteca Cochrane); revisión de resúmenes, selección para lectura en texto completo y evaluación de la calidad metodológica para inclusión. Debido a la heterogeneidad en el análisis y evaluación de la actividad de la AR, realizamos metaanálisis; los resultados se presentan como síntesis cualitativa.

Palabras clave:

Artritis reumatoide
Actividad inflamatoria
Composición corporal
Índice de masa corporal
Sobrepeso/obesidad
Revisión sistemática

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Resultados: Se identificaron 119 artículos; 16 fueron revisados en texto completo. Se incluyeron 11 artículos (8.147 pacientes; rango n: 37–5.161) que aprobaron la evaluación de calidad metodológica. La concordancia interevaluador para la calidad metodológica (CCI: 0,93; IC 95%:0,82–0,98; $p < 0,001$) y la decisión aceptación/rechazo (k 1,00, $p > 0,001$) fueron excelentes. En todos los estudios la composición corporal se evaluó mediante IMC, pero hubo marcada heterogeneidad en la evaluación de la actividad inflamatoria. Se encontró asociación significativa entre actividad clínica y mayores valores de IMC en 6 estudios de mayor tamaño muestral promedio (1.274; rango: 140–5.161), mientras que en 5 con menor tamaño muestral promedio (100; rango: 37–150) no se encontró asociación entre actividad e IMC.

Conclusiones: La asociación entre actividad de la AR e IMC en los estudios con tendencia a mayor potencia estadística indica que la masa grasa podría modular el estado clínico en AR. El estudio de la relación entre composición corporal y actividad inflamatoria en AR requiere de más estudios y de mayor calidad metodológica.

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Introduction

Rheumatoid arthritis (RA) is a chronic systemic inflammatory disease that is probably of autoimmune etiology. It is characterized by inflammation and proliferation of the synovial membrane of the diarthrodial joints and, if it progresses according to its natural history, results in joint destruction, typical deformities, disability and a reduced life expectancy.¹

The term “body composition” refers to the quantification of the different structural components of the human body, which can be estimated at the atomic, molecular, cellular, organ-tissue and whole body levels.² The estimation at the organ-tissue level using variables such as body mass index (BMI), skinfold thickness, waist and hip circumferences,³ and bioelectrical impedance⁴ enables the assessment of the nutrition status and the determination of the organism’s energy reserves and muscle mass. It also provides a valid estimate of the body fat percentage and the health risk derived from excess fat mass.

In recent decades, a series of findings has demonstrated that conditions involving excess fat mass in the body, like overweight and obesity, not only increase the risk of metabolic, neoplastic and cardiovascular diseases,⁵ but can be considered states of inflammatory activation, since the hypertrophic adipocytes of individuals with body compositions of these types are activated and release a number of soluble mediators known as adipocytokines or adipokines. The most important adipokines in terms of their proinflammatory activity are leptin, visfatin, interleukin 1 and tumor necrosis factor α .^{6,7} The latter 2 cytokines are relevant in the pathogenesis of RA, as they are crucial for the onset and persistence of the destructive synovitis that characterize this disease.⁸ These findings explain the interest in studying the effect of the changes in body composition characterized by excess adipose tissue on the modulation of the RA disease activity, as the confirmation of the existence of synergy between overweight or obesity and disease activity⁹ could justify the routine inclusion of interventions for the control and optimization of body composition as auxiliary measures in the treatment of RA patients.

However, the conclusions of reports that have evaluated the association between changes in body composition in terms of measurements of overweight or obesity and the level of disease activity in RA patients are contradictory.^{10,11} The reasons for this controversy very probably lie in the heterogeneity or weakness of the evaluation tools used both for body composition and the level of disease activity associated with RA, as well as weaknesses in the design and quality of the sample selection, all of which can be seen in the majority of the reports in which this question has been addressed.

Together, the above considerations indicate that, although the basic sciences provide arguments that suggest that a body composition in the excess adiposity range can modulate the clinical status of

RA patients, the conclusions of clinical studies that focus on determining the influence of nutritional status on the disease activity in these patients are contradictory. For these reasons, we decided to conduct the present systematic review to evaluate the association between the presence of overweight and obesity with the level of disease activity in patients with RA.

Material and Methods

Materials

The present systematic review was carried out between January and June 2014. The primary data sources were articles dealing with the relationship between type of body composition and the level of disease activity in RA patients. The inclusion criteria were cross-sectional or longitudinal comparative studies involving patients with RA—defined in accordance with the 1987 criteria of the American Rheumatism Association (ARA)¹² or the joint criteria of the American College of Rheumatology/European League Against Rheumatism (ACR/EULAR) of 2010¹³—in which an anthropometric method had been used to evaluate body composition. The studies also had to employ a validated clinical method for the determination of the level of RA disease activity, such as swollen joint count, the Ritchie articular index, the disease activity score with 28-Joint Counts (DAS 28), the Simplified Disease Activity Index (SDAI), the Clinical Disease Activity Index (CDAI), Routine Assessment of Patient Index Data (RAPID) or the Rheumatoid Arthritis Disease Activity Index (RADAI).¹⁴ Finally, reports had to present the numerical data necessary for the required analyses. We excluded review articles and studies that did not evaluate body composition or the level of disease activity in RA.

Methods

The present study adhered to the “finding, appraisal, synthesis and transferability” (FAST) methodology,¹⁵ applying the following general guidelines:

We used the “participants, interventions, comparisons and outcomes” (PICO) approach to create the research question, which was worded as follows: in patients with RA, is overweight or obesity associated with a higher level of disease activity compared to normal or low weight?

The “finding” stage encompassed the steps involved in the search for the information and application of the selection criteria to the articles encountered in the initial search. The search focused on articles retrievable in Spanish or English from the MEDLINE, EBSCO and the Cochrane Library databases using the keywords “adipose tissue”, “BMI”, “body mass index”, “obesity”, “overweight”, “nutritional status” and “rheumatoid arthritis”. Once the search had

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