INPLASY PROTOCOL

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Superb microvascular imaging evaluating joint lesion scores in rheumatoid arthritis compared with power Doppler imaging : a meta-analysis

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Review question / Objective: Rheumatoid arthritis is a chronic autoimmune disease characterized by polyarticular inflammation and pannus formation, leading to joint destruction and severe disability. Precise evaluation of synovial inflammation and bony deformity is very important for the management of RA, especially for early detection and evaluation of disease activity during follow-up. To some extent, the richness of pannus blood flow signals can reflect the severity of RA disease, so as to evaluate the development of RA disease. In tradition, power Doppler imaging(PDI) is used to detect the synovial vascularity, but because of the interference of tissue movement, it is not very sensitive to microvascular patterns and low blood flow velocity. Superb microvascular imaging(SMI) is a novel ultrasonic technology, which uses adaptive principle to display low-speed blood flow signal and several studies had suggested that SMI, as a promising alternative, can evaluate joint lesions in rheumatoid arthritis more sensitively comparable to PDI. However, the results of these studies have been contradictory and the sample sizes were small. Therefore, we performed the present meta-analysis to compare SMI with PDI for evaluating joint lesions in RA.

INTRODUCTION

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richness of pannus blood flow signals can reflect the severity of RA disease, so as to evaluate the development of RA disease. In tradition, power Doppler imaging(PDI) is used to detect the synovial vascularity, but because of the interference of tissue movement, it is not very sensitive to microvascular patterns and low blood flow velocity. Superb microvascular imaging(SMI) is a novel ultrasonic technology, which uses adaptive principle to display low-speed blood flow signal and several studies had suggested that SMI, as a promising alternative, can evaluate joint lesions in rheumatoid arthritis more sensitively comparable to PDI. However, the results of these studies have been contradictory and the sample sizes were small. Therefore, we performed the present meta-analysis to compare SMI with PDI for evaluating joint lesions in RA.

Condition being studied: Several studies had suggested that SMI, as a promising alternative, can evaluate joint lesions in rheumatoid arthritis more sensitively comparable to PDI. However, the results of these studies have been contradictory and the sample sizes were small.

METHODS

Participant or population: Rheumatoid arthritis.

Intervention: Superb microvascular.

Comparator: Power Doppler imaging.

Study designs to be included: Clinical cohort or case control study.

Eligibility criteria: (1) Participant: RA, (2) Intervention: SMI, (3) Comparison: PDI, (4)Outcome: OR, and (5)Study design: clinical cohort or case control study.

Information sources: We searched Medline (via PubMed), Web of Science, Cochrane Library, CISCOM, and CBM databases.

Main outcome(s): OR (SMI scores).

Quality assessment / Risk of bias analysis: The quality of selected studies was independently evaluated according to a tool for the quality assessment of methodological index for non-randomized studies(MINORS)

Strategy of data synthesis: The STATA version 15.1 software(Stata Corporation, College Station, TX, USA) was used for Meta-analysis. We calculated the pooled summary OR and its 95% confidence interval(CI). The Cochran's Q-statistic and I2 test were used to evaluate potential heterogeneity between studies. If Q test shows a P50% which indicates significant heterogeneity, the random-effect model was conducted, or else the fixed-effects model was used. In order to evaluate the influence of single study on the overall estimate, sensitivity analysis was performed. We also performed sub group and meta-regression analyses to investigate potential sources of heterogeneity.

Subgroup analysis: Position: Knee, Hand.DAS28: <3.2, >3.2.

Sensibility analysis: Sensitivity analysis was carried out.

Country(ies) involved: China.

Keywords: Superb microvascular imaging, Rheumatoid arthritis, Power Doppler imaging.

Contributions of each author:
Author 1 - XinMing Lin.
Author 2 - Cong Wang.