July 2022

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Cytokines and Chemokines Are Associated With the Risk of Cardiovascular Disease in Rheumatoid Arthritis Independent of Conventional Disease Activity Measures

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Mentor: Bryant England

Program: Rheumatology

Type: Original Research

Background: Because existing risk calculators underestimate cardiovascular disease (CVD) risk in rheumatoid arthritis (RA), additional biomarkers to prognosticate CVD are needed. We evaluated the associations of serum cytokines and chemokines with major adverse cardiovascular events (MACE) and whether subclinical inflammation as assessed by these mediators predicts CVD.

Methods: We followed patients in a prospective, multicenter RA cohort from enrollment to MACE, death, or end of follow-up. Cytokines and chemokines (n=33) were measured using banked serum at enrollment. Covariates included traditional CVD risk factors, RA disease activity, and relevant medications. Associations between analytes with incident MACE were estimated using multivariable Cox regression. In secondary analyses, we adjusted for RA disease activity and restricted analyses to patients in remission or low disease activity (LDA).

Results: A total of 406 MACE outcomes occurred amongst 2,712 RA patients over 22,216 person-years of follow-up. After multivariable adjustment, 12 of 33 analytes were associated with a higher risk of MACE (HR range 1.11-1.22). Associations between analytes and incident MACE persisted after further adjusting for baseline RA disease activity (Figure 1). Among 683 patients in remission/LDA, 97 MACE outcomes occurred in follow-up. Five analytes (IL-6, IL-15, IL-17A, IFN-g, and macrophage inflammatory protein-3-α) remained associated with incident MACE (HR range 1.19-1.50) in these patients.

Conclusion: Cytokines and chemokines were associated with a heightened risk of incident MACE, independent of traditional CVD risk factors and clinical RA disease activity, even amongst those in LDA or remission. Measuring pro-inflammatory mediators may aid in CVD risk stratification beyond existing traditional and RA-related CVD risk factors.

https://doi.org/10.32873/unmc.dc.gmerj.4.1.021

The Impact of Optics and Subjective Criteria on Clinical Refractions

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Program: Ophthalmology and Vision Science

Type: Original Research

Background: For eyes containing high levels of aberrations (e.g., post-LASIK, Keratoconus), subjective refraction can be very challenging clinically. This study is designed to examine the possible sources of inaccurate refraction and how to improve the accuracy of refraction.

Methods: We examined the impact of spherical aberrations, spatial frequency, and subjective criteria on the clinical refractions. Spherical aberration levels were controlled with custom made phase plates, and spatial frequency was controlled by employing high spatial frequency gratings, low spatial frequency gratings, or stimuli containing a broad range of spatial frequencies. Patients were asked to choose from the following options: 1 of 2 lenses which makes the letters “darker/ more contrast”, a lens which makes the letters look “sharper”, a lens which minimizes the starburst surrounding a point light source, or a lens which makes the point light source appears brightest.

Results: Clinical refractions biased to more myopic (over minus) if any of these occurs: (1) a low spatial frequency used, OR (2) if a “darker” criterion was chosen, OR (3) if the task was to minimize the starburst surrounding the point light source.

Conclusion: In presence of positive SA, refraction can become significantly myopic as stimuli or subjective criteria are changed from the pupil center focus to the pupil margin focus.

https://doi.org/10.32873/unmc.dc.gmerj.4.1.022