High Sensitivity C-Reactive Protein, Tumor Necrosis Factor-α, Interleukin-6, and Vascular Cell Adhesion Molecule-1 Levels in Asian Indians with Metabolic Syndrome and Insulin Resistance (CURES-105)

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Abstract

Aim:
The aim of this study was to assess levels of high-sensitivity C-reactive protein (hs-CRP), tumor necrosis factor-α (TNF-α), interleukin-6 (IL-6), and vascular cell adhesion molecule-1 (VCAM-1) in South Indian subjects with and without MS and among MS subjects with and without insulin resistance (IR).

Methodology:
From the population-based Chennai Urban Rural Epidemiology Study, 334 subjects with MS and 342 subjects without MS were selected. Metabolic syndrome was diagnosed based on modified National Cholesterol Education Program criteria. High-sensitivity C-reactive protein, TNF-α, IL-6, and VCAM-1 were measured by enzyme-linked immunosorbent assay. Insulin resistance was calculated using the homeostasis model assessment (HOMA-IR) using the following formula: fasting insulin (µIU/ml) × fasting glucose (mmol/liter)/22.5.

Results:
Subjects with MS had significantly higher levels of all four inflammatory markers compared to those without MS: hs-CRP (2.57 vs 2.19 mg/liter) (p < .05), TNF-α (4.47 vs 3.89 pg/ml) (p < .05), IL-6 (16.22 vs 10.96 pg/ml) (p < .05), and VCAM-1 (13.8 vs 7.94 pg/ml) (p < .05). In the total study subjects, hs-CRP (r = 0.089, p = .047), TNF-α (r = 0.113, p = .040), IL-6 (r = 0.176, p = .042), and VCAM-1 (r = 0.230, p = .06) were significantly correlated with MS. With increasing quartiles of IR, mean levels of hs-CRP (p for trend <.001) and TNF-α (p for trend <.05) increased linearly. MS subjects with IR had higher levels of hs-CRP (p < .001) and TNF-α (p < .05) compared to MS subjects without IR.

Conclusion:
In Asian Indians, inflammatory cytokines hs-CRP, TNF-α, IL-6, and VCAM-1 are elevated in subjects with MS while hs-CRP and TNF-α are further elevated in those with MS and IR.