C-reactive protein as a predictor for incident diabetes mellitus among middle-aged men: results from the MONICA Augsburg cohort study, 1984-1998.


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BACKGROUND: Previous studies have suggested that low-grade systemic inflammation is involved in the pathogenesis of type 2 diabetes mellitus. OBJECTIVE: To investigate the association between C-reactive protein (CRP), the classic acute-phase protein, and incident type 2 diabetes mellitus among middle-aged men. METHODS: A total of 2052 initially nondiabetic men aged 45 to 74 years who participated in 1 of the 3 MONICA (Monitoring of Trends and Determinants in Cardiovascular Disease) Augsburg surveys between 1984 and 1995 were followed up for an average of 7.2 years. Incidence of diabetes was assessed by questionnaire mailed to participants in 1998. High-sensitive CRP was measured by an immunoradiometric assay. RESULTS: A total of 101 cases of incident diabetes occurred during the follow-up period. The age-standardized incidence rate was 6.9 per 1000 person-years. Men with CRP levels in the highest quartile (CRP ≥ 2.91 mg/L) had a 2.7 times higher risk of developing diabetes (95% confidence interval, 1.4-5.2) compared with men in the lowest quartile (CRP < or = 0.67 mg/L) in a Cox proportional hazards model adjusted for age and survey. After further adjustment for body mass index, smoking, and systolic blood pressure, the observed association was significantly reduced and became nonsignificant. CONCLUSIONS: Low-grade systemic inflammation is associated with an increased risk of type 2 diabetes mellitus in middle-aged men. Inflammation could be one mechanism by which known risk factors for diabetes mellitus, such as obesity, smoking, and hypertension, promote the development of diabetes mellitus.