

## Factors Associated with Highly-Sensitive C-Reactive Protein (Hs-Crp) Level in 41,630 Adults who Participated in the Health-Check Program in Asan Medical Center

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**Introduction and Aims :** Cardiovascular disease remains the most common cause of morbidity and mortality in patients with end-stage renal disease. Recently, it has become clear that inflammation is an important process in the pathogenesis of atherosclerosis. Up to date, cardiovascular risk factors which are reported to be associated with hs-CRP in the general population includes atherosclerosis, diabetes, hypertension, smoking, age, gender, body mass index, pulse pressure, triglycerides, HDL-cholesterol and glomerular filtration rate. It is possible that there are some differences in the causes of chronic inflammatory process between Western and Asian. This study was undertaken to evaluate factors associated with circulating hs-CRP in the health-check program participants in Asan Medical Center.

**Methods :** At 2004, 41,630 adult subjects (M : F=24,364 : 17,266, age  $47.4 \pm 10.5$  years) who visited Health Promotion Center in Asan Medical Center and enrolled this cross-sectional study. The medical checkup program was composed of the taking of a full medical history, physical examinations, hs-CRP, liver function tests, glucose, glycosylated hemoglobin, calcium, phosphorus, uric acid, protein, albumin, electrolytes, lipid profile, complete blood count, serological tests such as rheumatoid factor, hepatitis B virus surface antigen carrier, hepatitis C virus antibody, HIV virus, VDRL and *Helicobacter pylori* antibody, urinalysis, a stool examination, thyroid function tests, a chest roentgenogram, an electrocardiogram, a respiratory function, abdominal ultrasonography and duodenofiberscopy or a fluoroscopic examination of the upper gastrointestinal tract. hs-CRP level was analyzed with clinical characteristics and results of other tests.

**Results :** hs-CRP level was significantly higher in men, smoker and patients with diabetes mellitus, hypertension, ischemic heart disease, fatty liver disease, gastritis and gastric ulcer than in subjects without these diseases. But there was not significant elevation of hs-CRP in patients with inactive hepatitis B virus surface antigen carrier state, hepatitis C virus antibody and *Helicobacter pylori* antibody. In univariate regression analysis, there were significantly correlated between hs-CRP and each of body mass index (BMI) ( $r=0.269$ ,  $p<0.001$ ), alkaline phosphatase (ALP) ( $r=0.246$ ,  $p<0.001$ ), HDL-cholesterol ( $r=-0.207$ ,  $p<0.001$ ), uric acid ( $r=0.194$ ,  $p<0.001$ ),  $\gamma$ -glutamyl transferase ( $\gamma$ -GT) ( $r=0.176$ ,  $p<0.001$ ), triglyceride ( $r=0.168$ ,  $p<0.001$ ), systolic blood pressure ( $r=0.166$ ,  $p<0.001$ ) and age ( $r=-0.150$ ,  $p<0.001$ ). In multivariate regression analysis, ALP ( $r=0.173$ ,  $p<0.001$ ), BMI ( $r=0.159$ ,  $p<0.001$ ) and HDL-cholesterol ( $r=-0.100$ ,  $p<0.001$ ) were independent factors correlated with hs-CRP.

**Conclusion :** This result suggests that liver dysfunction as well as cardiovascular disease risk factors were associated with hs-CRP level in the health-check program participants in Asan Medical Center.