제2형 당뇨병 환자 및 당뇨병과 심혈관질환이 없는 성인을 대상으로 조사한 심혈관관계질환의 위험인자와 혈청 high sensitivity C-reactive protein 사이의 관련성 비교

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=Abstract=

Association of serum high sensitivity C-reactive protein with risk factors of cardiovascular diseases in type 2 diabetic and nondiabetic subjects without cardiovascular diseases

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Background: High sensitivity C-reactive protein (hsCRP) is more sensitive than standard CRP assay for evaluation of risk of coronary heart diseases and other atherosclerotic events. But, there were no data of association of serum hsCRP with risk factors of cardiovascular diseases and nonalcoholic fatty liver in Korean type 2 diabetic and nondiabetic subjects.

Methods: A hundred type 2 diabetic subjects (51 men and 49 women) from Severance Hospital and 200 nondiabetic subjects participating medical checkup in Health Promotion Center (105 men and 95 women) were recruited and subjects with acute illnesses and chronic inflammatory diseases such as upper respiratory infection, rheumatoid arthritis, osteoarthritis, or viral hepatitis were excluded. A standardized interview was conducted by trained personnel: detailed information was collected on medical history, dietary habits and lifestyle characteristics, including smoking, alcohol and physical activity. Body mass index (BMI) was computed and biochemical study were undergone using fasting blood. All subjects were done abdominal ultrasonography for evaluation of fatty liver. Serum hsCRP concentration was measured by Nephelometer Analyzer II (Behring Co.) and a lower detection limit of test was 0.18 mg/L.

Results: There was no difference in sex, BMI, presence of fatty liver, concentration of total cholesterol, triglyceride, high density lipoprotein-cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C) and uric acid between diabetic and nondiabetic subjects. Age, total
colesterol/HDL-C ratio, fasting blood glucose and incidence of hypertension were higher in diabetic than nondiabetic subjects, but a rate of smoking was higher in nondiabetic than diabetic subjects.

The mean concentration of serum hsCRP was remarkably increased in type 2 diabetic subjects than nondiabetic subjects (1.34±1.87 vs 0.71±0.80 mg/L, p<0.05). After adjustment of different variables between both groups, there was significantly difference of the concentration of serum hsCRP (p<0.05). In nondiabetic subjects, by univariate analysis, there was a positive correlation between hsCRP and age (r=0.26, p<0.05), BMI (r=0.34, p<0.05), systolic blood pressure (r=0.21, p<0.05), diastolic blood pressure (r=0.16, p<0.05), triglyceride (r=0.27, p<0.05), total cholesterol/HDL-C ratio (r=0.22, p<0.05), uric acid (r=0.15, p<0.05) and a negative correlation between serum hsCRP and HDL-C (r=−0.16, p<0.05). Interestingly, subjects with fatty liver had shown increased serum hsCRP concentration than subjects without fatty liver (0.99±0.96 vs 0.58±0.69 mg/L, p<0.05). But there were no correlation of serum hsCRP with the history of smoking, sex, physical activity, fasting plasma glucose and presence of hypertension. After multiple regression analysis, only BMI and age were associated with serum hsCRP. In diabetic subjects, there were significant correlation of serum hsCRP with HDL-C and fasting plasma glucose, but other risk factors of cardiovascular diseases and fatty liver were not. When we compared serum hsCRP according to numbers of risk factors of cardiovascular diseases in nondiabetic subjects, group without risk factors had 0.41±0.55 mg/L, group with one risk factor had 0.48±0.40 mg/L, group with two risk factors had 0.75±0.88 mg/L, group with three risk factors had 1.08±0.87 mg/L and group with four risk factors had 1.55±1.21 mg/L. There was significant difference of serum hsCRP according to numbers of risk factors of cardiovascular diseases (p<0.05).

Conclusion: Serum hsCRP is correlated with risk factors of cardiovascular diseases and may be useful tool for prediction of accelerated, atherosclerotic process in nondiabetic subjects. Although there is association of serum hsCRP with few risk factors of cardiovascular diseases, serum hsCRP is elevated in diabetic subjects. Therefore it is necessary to evaluate usefulness of serum hsCRP using carefully selected diabetic subjects. In addition, our study had shown that subjects with nonalcoholic fatty liver have increased risk of cardiovascular events. (Korean J Med 63:36-43, 2002)

Key Words: High sensitivity C-reactive protein, Risk factors, Cardiovascular diseases, Nonalcoholic fatty liver, Type 2 diabetes

서 론

측량항생화중증은 측량에 환성화된 밀프루, 대식세포 및 이상지질이 침착하며 근세포의 이동 및 신생혈관 등으로 특정치우지는 염증성 범법으로 interleukin-6 (IL-6)와 tumor necrosis factor-α (TNF-α)와 같은 cytokines 및 C-reactive protein (CRP)과 같은 급성기 반응단백이 증가하는 것에 알려져 있다1-3). 혈청 CRP의 증가가 심혈관계질환과 관련되어 있다는 가정은 1940년대부터 있어왔으나 당시의 표준적인 혈청 CRP 측정법은 측정의 하한이 3~8 mg/L에 불과하여 낮은 정 상범위에서 염증의 정도를 구분하기는 힘들어 심 혈관계질환의 위험을 검출하는데 부적절하였으며, 최근까지도 측정의 하한이 1 mg/L로 심혈관계질환의 위험 도를 평가하는데 한계가 있었다3).

최근에 혈청 CRP 측정시 더나은 항체와 개선된 기 술을 사용하여 high-sensitivity assay나 ultrasensitive assay가 개발되었고 상업적으로도 이용이 가능해졌으며, 외국에서는 몇 개의 표준화 프로그램이 진행될기도 하였다4-7). 이러한 프로그램들에서 혈관질환의 위험을 평가하는 혈청 high sensitivity CRP (hsCRP)의 감별력은 혈청 총콜레스테롤과 거의 같은 수준으로 보고되었고 임상적 이용가 활용해지고 있으나 국내에서는 관상동맥 질환을 가진 환자들을 대상으로 표준적인 CRP 측정법을 이용한 보고들이 대부분이어서8-11) 심혈관계질환이 없는 사람들의 위험을 평가하는데 적절한 지표가 없는 현상이다.

우리는 이 연구에서 제2형 당뇨병 환자 및 당뇨병과 심혈관계질환 없는 성인을 대상으로 심혈관계질환의 위험 인자들과 비알코올성 지방간의 유무에 따라 혈청 hsCRP의