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Correspondence

C-reactive protein as an optional component of metabolic syndrome

To the Editor:

I was impressed with the similarity of C-reactive protein (CRP) values among Koreans, presented in the article by Choi et al [1], to our data [2] in Japanese. Median CRP values were 0.6 mg/L for men and 0.4 mg/L for women in Koreans [1] and 0.6 mg/L for men and 0.3 mg/L for women in Japanese [2], although there were some differences in methods used to measure CRP levels and in mean age and mean body mass index of the subjects. These values are quite low compared with median CRP values in Europeans. Geometric means of CRP among subjects with each component of metabolic syndrome were 0.7 and 0.7 mg/L for abdominal obesity (waist circumference ≥90 cm for men and ≥80 cm for women), 0.7 and 0.6 mg/L for blood pressure (≥130/85 mm Hg or antihypertensive medication), 0.8 and 0.6 mg/L for high-density lipoprotein cholesterol (<40 mg/dL for men and 50 mg/dL for women), 0.8 and 0.7 mg/L for triglyceride (≥150 mg/dL), and 1.0 and 0.8 mg/L for fasting glucose (≥110 mg/dL) in men and women, respectively, and geometric means of CRP among subjects without each component of metabolic syndrome were 0.6 and 0.4 mg/L for abdominal obesity (waist circumference <90 cm for men and <80 cm for women), 0.6 and 0.4 mg/L for blood pressure (<130/85 mm Hg), 0.6 and 0.4 mg/L for high-density lipoprotein cholesterol (≥40 mg/dL for men and ≥50 mg/dL for women), 0.6 and 0.4 mg/L for triglyceride (<150 mg/dL), and 0.7 and 0.5 mg/L for fasting glucose (<110 mg/dL) in men and women, respectively, among Koreans [1], whereas the optimal cut point of CRP as a discriminator of metabolic syndrome was 0.65 mg/L for both men and women among Japanese when body mass index of 25 or greater was applied in place of abdominal obesity [2]. The sensitivity and specificity for this CRP value as a discriminator of metabolic syndrome were 0.739 and 0.609, respectively, for men and 1.000 and 0.756, respectively, for women when impaired fasting glucose was defined as 110 mg/dL or greater, and 0.650 and 0.626, respectively, for men and 1.000 and 0.771, respectively, for women when impaired fasting glucose was defined as 100 mg/dL or greater [2]. I would appreciate it if Choi et al also analyze optimal cut points of CRP as a discriminator of metabolic syndrome among Koreans.

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Reply: Different population, different cutoff points

To the Editor:

Dr Oda pointed out the similarity of C-reactive protein (CRP) values among Koreans to those in Japanese [1]. As we previously discussed, median CRP values among young and middle-aged Koreans, whether they had metabolic syndrome or not, were quite low compared with those among whites [2]. Elevated CRP has been strongly associated with various characteristics of the metabolic syndrome in many studies, and its inclusion in the definition of the metabolic syndrome improved its predictive ability for diabetes and cardiovascular disease [3,4]. Therefore, it is interesting to analyze the optimal cut points as a discriminator of metabolic syndrome among Koreans and compare them with those among Japanese people.

We evaluated cutoff points of CRP from tables of sensitivity and specificity for metabolic syndrome, defined as our previous report [2]. The CRP values that corresponded with the highest accuracy (minimal false-negative and false-positive results) were presented for men and women.

The optimal cutoff point of CRP was 0.84 mg/L in men and 0.69mg/L in women. The sensitivity and specificity for this CRP value as a discriminator of metabolic syndrome were 0.457 and 0.656, respectively, for men and 0.608 and 0.743, respectively, for women. The area under a receiver operating characteristic curve was 0.588 for men and 0.745 for women (Table 1). Receiver operating characteristic

Table 1
Optimal cutoff points and AUCs of CRP by sex

	Cutoff point (mg/dL)	Men		Cutoff point (mg/dL)	Women	
		Sensitivity	Specificity		Sensitivity	Specificity
MS110[a]	0.84	0.457	0.656	0.69	0.608	0.743
MS100[b]	0.84	0.455	0.661	0.69	0.615	0.751
BMI ≥25 kg/m^2[c]	0.84	0.457	0.656	0.68	0.619	0.731
	AUC	95% CI of AUC		AUC	95% CI of AUC	
MS110[a]	0.588	0.540	0.637	0.745	0.693	0.797
MS100[b]	0.589	0.541	0.636	0.751	0.708	0.807
BMI ≥25 kg/m^2[c]	0.588	0.540	0.637	0.750	0.696	0.805

MS indicates metabolic syndrome; AUC, area under a receiver operating characteristic curve; CI, confidence interval.
[a] Metabolic syndrome defined by impaired fasting glucose of 110 mg/dL or more.
[b] Metabolic syndrome defined by impaired fasting glucose of 100 mg/d or more.
[c] Instead of abdominal obesity criteria, a body mass index of 25 kg/m^2 or more was used in the definition of metabolic syndrome.

curves are shown in Fig. 1. When impaired fasting glucose was defined as 100 mg/dL or more or abdominal obesity was replaced with body mass index of 25 kg/m^2 or more, the optimal cutoff points of CRP for men and women were not so different.

Dr Oda found that the optimal cutoff point of CRP as an optional component of metabolic syndrome in Japan was 0.65 mg/dL. In our sample, both sensitivity and specificity of this CRP value were lower than Japanese population; 0.521 and 0.654, respectively, for men and 0.608 and 0.738, respectively, for women. Even the median CRP values were similar; there are several differences between two populations; our sample was younger by 10 years, had more subjects with obesity, high blood pressure, high triglyceride, low high-density lipoprotein cholesterol, and fewer subjects with impaired fasting glucose for both men and women. These differences may contribute to the difference in the optimal cutoff point of CRP between 2 populations.

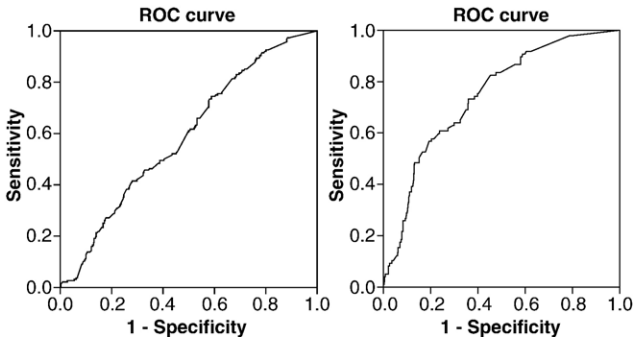

Fig. 1. Receiver operating characteristic curves of CRP for discrimination of metabolic syndromes, defined by impaired fasting glucose of 110 mg/dL or more.

At present, therefore, there are insufficient data to apply universal cutoff point of CRP for populations with different age, sex, ethnicity, and prevalence of metabolic syndrome risk factors. Future prospective studies with larger sample size and diverse ethnic backgrounds will be needed to find the optimal cutoff point of CRP for predicting diabetes and cardiovascular disease.

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