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Research Article

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The Characteristics of Risk Factors in Korean CAD Patients Comparing to American Counterpart and Its Implications to Prevention of CAD

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| Abstract |

PURPOSE: The purpose of this study is to understand the difference in the risk factors of coronary artery disease (CAD) between Korean and American CAD patients to determine the discriminant factor for each group, as well as to provide useful information to be reflected in the national concern of health.

METHODS: Data were collected from 248 Korean and 107 American CAD patients who underwent either percutaneous coronary intervention or coronary artery bypass grafting. By using t-test and X^2-test, risk factors were compared between the Koreans and Americans. To elucidate which risk factor was the most discriminant for each group, logistic regression analysis was performed.

RESULTS: All risk factors, except diastolic blood pressure, showed a significant difference between the two groups. X^2-test showed statistical significance with respect to the smoking rate between the female groups. Moreover, there was a statistically significant difference between the two groups regarding blood total cholesterol (TC) and triglyceride, and between the male groups, here was a statistically significant difference with respect to blood high-density lipoprotein cholesterol (HDL). Diabetes mellitus (DM) was the most discriminant factor for Korean patients while TC/HDL is the most discriminant for the Americans.

CONCLUSION: The characteristics of CAD risk factors were determined to be different between Koreans and Americans in this study. TC/HDL was a discriminant factor for Americans while DM was a discriminant factor for Koreans. This result implies that DM should primarily be given attention to prevent CAD in Korean adults.

Key Words: CAD risk, International comparison, Prevention of CAD

Ⅰ. Introduction

Prevalence of CAD in Korea has been increasing rapidly during the past decades resulting in a serious social issue. CAD prevalence accelerated from the mid-1990s to early 2000s to become a major cause of death in Korea (Statistics Korea, 2016). It is common to see higher prevalence of CAD in most well-industrialized counties and Korea is not an exception.

It is well known that the term risk factor came from famous Framingham Study. Risk factors are non-modifiable factors like aging, gender, heredity as well as modifiable

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ones as hypertension, hyperlipidemia, smoking, diabetes, sedentary lifestyle, and psychological disorders. In addition, lipoprotein a, homocysteine, C-reactive protein, hemostatic factor, oxidative stress etc. emerged as new risk factors (Eckel and Krauss, 1998; Gordon, 1998).

However, it is questionable whether those risk factors appear with a similar pattern in most countries. Recent globalization has made it easy to propagate cultures and to exchange it rapidly throughout the world. In this perspective, it might be considered that the increase of CAD in Korea is partially due to acquired cultural habit like occidental diet. From the other viewpoint, proper CAD risks come from Korean ethnographic characteristics should be inferred as well.

The purpose of this study is to examine CAD risk factors between Korean and American to identify how Korean CAD patients differ from their American counterpart and to provide useful information to be reflected in the national concern of health. This result can also provide a good lesson to other developing Asian countries.

Ⅱ. Methods

1. Subject

The data was collected from 248 Korean and 107 American CAD patients who were given either percutaneous coronary intervention or coronary artery bypass grafting. Data of Korean patients were randomly collected from Heart Institute of a Medical Center in Seoul Korea and American data were gathered from cardiac rehabilitation program in both North Carolina and Indiana with permission of the person in charge of the program. Table 1 shows there was not a statistical difference in age between the two groups.

2. Statistics

The risk factors dealt in this study were TC, low-density lipoprotein cholesterol (LDL), HDL, triglyceride (TG), non-HDL, TC/HDL, smoking, blood pressure, diabetes, and body composition. Unfortunately, data for physical inactivity and psychological disorder were not feasible to collect from both sides. The difference between the mean

Table 1. Demographics

		n	Mean±SD	T value	p
Age	Total	K (248) A (107)	58.76±9.78 58.93±11.28	-.15	.88
	Male	K (179) A (74)	57.37±10.02 57.64±11.03	-.18	.86
	Female	K (69) A (33)	62.35±8.15 61.85±11.45	.23	.82
Weight	Total	K (248) A (107)	67.62±11.87 91.36±19.01	-11.95	.00
	Male	K (179) A (74)	70.46±11.99 96.12±18.29	-11.12	.00
	Female	K (69) A (33)	60.28±7.70 80.68±16.27	-6.84	.00
Height	Total	K (248) A (107)	163.34±8.98 171.99±10.55	-7.90	.00
	Male	K (179) A (74)	166.58±7.65 177.24±6.97	-10.33	.00
	Female	K (69) A (33)	154.92±6.32 160.24±7.22	-3.79	.00

K; Korean, A; American

value of risk factors between the two groups were compared by using independent t-test. Smoking and the existence of DM were compared with X^2-test. Logistic regression analysis was performed to compare characteristics of Korean CAD risk pattern from Americans. Backward stepwise elimination was used as variable selection method to fit the regression model. X^2-test was done to compare the difference between two groups for risk factors exceeding borderline. The level of significance below .05 was considered as statistical good through in this study.

Ⅲ. Results

1. Comparison of mean value of risk factors

Table 2 shows the difference of the mean value of each

Table 2. Comparison of Mean Values of Risk Factors

		Mean±SD		t	p-value
		Korean	American		
BMI (kg/m^2)	Total	25.22±2.90	30.82±5.57	-9.83	.00
	Male	25.27±2.98	30.53±5.25	-8.09	.00
	Female	25.10±2.69	31.46±6.25	-5.60	.00
BF (%)	Total	26.80±7.21	33.82±10.44	-6.33	.00
	Male	24.26±5.60	29.96±8.54	-5.29	.00
	Female	33.41±6.76	42.48±9.09	-5.65	.00
SBP (mmHg)	Total	121.27±16.42	129.35±18.63	-4.08	.00
	Male	121.56±16.04	128.95±17.17	-3.26	.00
	Female	120.51±17.49	130.24±21.80	-2.42	.02
DBP (mmHg)	Total	75.74±10.93	77.25±10.43	-1.21	.23
	Male	75.52±10.48	77.38±10.16	-1.30	.20
	Female	76.32±12.08	76.97±11.18	-.26	.80
TC (mg/dL)	Total	146.74±34.64	76.97±11.18	-6.66	.00
	Male	144.41±33.75	171.38±39.83	-5.48	.00
	Female	152.78±36.42	192.00±45.13	-4.70	.00
HDL (mg/dL)	Total	49.65±11.96	40.48±11.77	-6.66	.00
	Male	48.44±11.47	36.49±7.65	9.66	.00
	Female	52.81±12.69	49.42±14.53	1.21	.23
TC/HDL	Total	3.09±.94	4.67±1.46	-10.30	.00
	Male	3.11±.90	4.87±1.37	-10.15	.00
	Female	3.06±1.03	4.23±1.56	-3.90	.00
Non-HDL (mg/dL)	Total	97.09±34.84	136.84±41.89	-9.26	.00
	Male	95.98±33.86	134.28±39.85	-7.76	.00
	Female	99.97±37.35	142.58±46.27	-4.98	.00
TG (mg/dL)	Total	126.94±65.49	172.54±86.40	-4.89	.00
	Male	126,63±64.51	167.11±82.71	-3.70	.00
	Female	127.75±68.47	184.73±94.35	-3.46	.01
LDL (mg/dL)	Total	84.73±31.19	101.83±34.49	-4.57	.00
	Male	83.37±30.74	100.59±34.82	-3.90	.00
	Female	88.23±35.27	104.70±34.11	-2.34	.02

The numbers are same as Table 1
; Total (Korean 248, American 107), Male (Korean 179, American 74), Female (Korean 69, American 33)
BMI; Body mass index; BF; Body fat; SBP; systolic blood pressure, DBP; diastolic blood pressure, TC; total cholesterol, HDL; high-density lipoprotein cholesterol, TG; triglyceride, LDL; low-density lipoprotein cholesterol

variable between two groups. It indicates that all variables except diastolic blood pressure (DBP) showed a significant difference between the two groups. Mean values of variables in American patients were higher than those in Koreans except HDL. The level of HDL was significantly higher in Korean male than their American counterpart, but there was no difference between females.

2. Comparison of DM, smoking, and blood lipids exceed borderline

By using X^2-test, this study could examine the difference between the two groups in DM prevalence (Table 3), smoking (Table 4) and blood lipids (Table 5) that exceed borderline. The borderline was based on American College of Sports Medicine's criteria (Roger et al., 2012; Moyer, 2004). The borderline value of lipids were 200mg/dL for TC, 130mg/dL for LDL, 150mg/dL for TG. The borderline of HDL was 40mg/dL and 50mg/dL for male and female, respectively.

The diabetic patients were 22.6% of Korean and 19.6% of American. Though this difference was not significant, the number of Korean diabetics were a little larger than that of American. As for male patients, 21.8% of Korean and 13.5% of American were diabetic, showing higher DM prevalence in Korean male patients. The existence of DM for female patients were very similar for both sides.

Fifty percent of Korean patients were smoker while smoking rate of American patients was 53.3%. For the male patients, 67% of Korean male patients and 58.1% of American were smokers. The smoking rate was 10% higher in Korean patients, though there was not a statistical significance. However, there were distinct differences between female Korean and American smokers. The percentage of smokers in Korean female patients was only 5.8%, while approximately 50% of American female patients were smokers. This difference was statistically significant (X^2=20.61, p=.00).

Among patients with TC level was higher than 200mg/Dl, 7.3% were Korean and 24.3% were American. The number of American patients whose TC level exceeded borderline were about 3 times more than that of their Korean counterparts, resulting in a statistically significance (X^2=19.99, p=.00). Among Korean patients, 25.4% had TG that exceeded 150mg/dL, while the percentage of American patients was 49.5%. Americans showed about a 2 times larger percentage than Korean showing a statistically significance (X^2=19.78, p=.00). As for LDL, the percentage of patients whose value exceeded borderline were 9.7% and 16.8% for Korean and American, respectively. Though this difference was not significance with a p-value of a little bit higher than 5% (X^2=3.66, p=.06), this study shows the percentage of American patients were still about 2 times higher. The number of American male patients who showed HDL below 40mg/dL was more than 2 times higher. The percentage showed 19% and 47.7% in Korean and American, respectively. This difference showed statistical significance (X^2=30.83, p=.00) but female patients did not show a significant difference in the percentage of patients who had HDL below the borderline (X^2=1.71, p=.19). Among Korean female patients, 12.5% had HDL below 50mg/dL, while the percentage of American women was 17.8%.

3. Logistic regression for discriminating the characteristics of patients

To make the most appropriate model for discriminating patients' characteristics, this study assumed logistic regression model as seen below. Every risk factor dealt in this study is shown as the independent variable of this model.

$$\log p(\text{Korean})/p(\text{American}) = \beta 0 + \beta 1BF + \beta 2SBP + \cdots \beta 11DM + \beta 12SM$$

$$P(\text{Korean}) = 1 / 1 + \exp[-(\beta 0 + \beta 1BF + \beta 2SBP + \cdots \beta 11DM + \beta 12SM)]$$

Table 3. X^2- test for DM

Total patients				
X^2=.38 (p=.54)		DM		Total
		Yes	No	
Korean	Observed/Expected Value	56/53.8	192/194.2	248/248.0
	Nationality	22.6%	77.4%	100.0%
	DM	72.7%	69.1%	69.9%
	Total	15.8%	54.1%	69.9%
American	Observed/Expected Value	21/23.2	86/83.8	107/107.0
	Nationality	19.6%	80.4%	100.0%
	DM	27.3%	30.9%	30.1%
	Total	5.9%	24.2%	30.1%
Total	Observed/Expected Value	77/77.0	278/278.0	355/355.0
	Nationality	21.7%	78.3%	100.0%
	DM	100.0%	100.0%	100.0%
	Total	21.7%	78.3%	100.0%
Male patients				
X^2=2.30 (p=.13)		DM		Total
		Yes	No	
Korean	Observed/Expected Value	39/34.7	140/144.3	179/179.0
	Nationality	21.8%	78.2%	100.0%
	DM	79.6%	68.6%	70.8%
	Total	15.4%	55.3%	70.8%
American	Observed/Expected Value	10/14.3	64/59.7	74/74.0
	Nationality	13.5%	86.5%	100.0%
	DM	20.4%	31.4%	29.2%
	Total	4.0%	25.3%	29.2%
Total	Observed/Expected Value	49/49.0	204/204.0	253/253.0
	Nationality	19.4%	80.6%	100.0%
	DM	100.0%	100.0%	100.0%
	Total	19.4%	80.6%	100.0%
Female patients				
X^2=.85 (p=.36)		DM		Total
		Yes	No	
Korean	Observed/Expected Value	17/18.9	52/50.9	69/69.0
	Nationality	24.6%	75.4%	100.0%
	DM	60.7%	70.3%	67.6%
	Total	16.7%	51.0%	67.6%
American	Observed/Expected Value	11/9.0	22/23.9	33/33.0
	Nationality	33.3%	66.7%	100.0%
	DM	39.3%	29.7%	32.4%
	Total	10.8%	21.6%	32.4%
Total	Observed/Expected Value	28/28.0	74/74.0	102/102.0
	Nationality	27.5%	72.5%	100.0%
	DM	100.0%	100.0%	100.0%
	Total	27.5%	72.5%	100.0%

DM; diabetes mellitus

Table 4. X^2- test for Smoking

Total patients				
X^2=.32 (p=.57)		Smoking		Total
		Yes	No	
Korean	Observed/Expected Value	124/126.4	124/121.6	248/248
	Smoking	68.5%	71.3%	69.9%
	Nationality	50.0%%	50.0%	100.0%
	Total	34.9%%	34.9%	69.9%
American	Observed/Expected Value	57/54.6	50/52.4	107/107.0
	Smoking	31.5%	28.7%	30.1%
	Nationality	53.3%	46.7%	100.0%
	Total	16.1%	14.1%	30.1%
Total	Observed/Expected Value	181/181.0	174/174.0	355/355.0
	Smoking	100.0%	100.0%	100.0%
	Nationality	51.0%	49.0%	100.0%
	Total	51.0%	49.0%	100.0%
Male patients				
X^2=1.82 (p=.18)		Smoking		Total
		Yes	No	
Korean	Observed/Expected Value	120/115.3	59/63.7	179/179.0
	Smoking	73.6%	65.6%	70.8%
	Nationality	67.0%	33.0%	100.0%
	Total	47.4%	23.3%	70.8%
American	Observed/Expected Value	43/47.7	31/26.3	74/74.0
	Smoking	26.4%	34.4%	29.2%
	Nationality	58.1%	41.9%	100.0%
	Total	17.0%	12.3%	29.2%
Total	Observed/Expected Value	163/163.0	90/90.0	253/253.0
	Smoking	100.0%	100.0%	100.0%
	Nationality	64.4%	35.6%	100.0%
	Total	64.4%	35.6%	100.0%
Female patients				
X^2=20.61 (p=.00)		Smoking		Total
		Yes	No	
Korean	Observed/Expected Value	4/12.2	65/56.8	69/69.0
	Smoking	22.2%	77.4%	67.6%
	Nationality	5.8%	94.2%	100.0%
	Total	3.9%	63.7%	67.6%
American	Observed/Expected Value	14/5.8	19/27.2	33/33.0
	Smoking	77.8%	22.6%	32.4%
	Nationality	42.4%	57.6%	100.0%
	Total	13.7%	18.6%	32.4%
Total	Observed/Expected Value	18/18.0	84/84.0	102/102.0
	Smoking	100.0%	100.0%	100.0%
	Nationality	17.6%	82.4%	100.0%
	Total	17.6%	82.4%	100.0%

Table 5. X^2- test for Blood Lipids in Total Patients

X^2=19.99 (p=.00)		TC		Total
		≥200mg/dL	<200mg/dL	
Korean	Observed/Expected Value	18/30.7	230/217.3	248/248.0
	Nationality	7.3%	92.7%	100.0%
	TC	40.9%	74.0%	69.9%
	Total	5.1%	64.8%	69.9%
American	Observed/Expected Value	26/13.3	81/93.71	107/107.0
	Nationality	24.3%	75.7%	100.0%
	TC	59.1%	26.0%	30.1%
	Total	7.3%	22.8%	30.1%
Total	Observed/Expected Value	44/44.0	311/311.0	355/355.0
	Nationality	12.4%	87.6%	100.0%
	TC	100.0%	100.0%	100.0%
	Total	12.4%	87.6%	100.0%
X^2=19.78 (p=.00)		TG		Total
		≥150mg/dL	<150mg/dL	
Korean	Observed/Expected Value	63/81.0	185/167.0	248/248.0
	Nationality	25.4%	74.6%	100.0%
	TG	54.3%	77.4%	69.9%
	Total	17.7%	52.1%	69.9%
American	Observed/Expected Value	53/35.0	54/72.0	107/107.0
	Nationality	49.5%	50.5%	100.0%
	TG	45.7%	22.6%	30.1%
	Total	14.9%	15.2%	30.1%
Total	Observed/Expected Value	116/116.0	239/239.0	355/355.0
	Nationality	32.7%	67.3%	100.0%
	TG	100.0%	100.0%	100.0%
	Total	32.7%	67.3%	100.0%
X^2=3.66 (p=.06)		LDL		Total
		≥130mg/dL	<130mg/dL	
Korean	Observed/Expected Value	24/29.3	224/218.7	248/248.0
	Nationality	9.7%	90.3%	100.0%
	LDL	57.1%	71.6%	69.9%
	Total	6.8%	63.1%	69.9%
American	Observed/Expected Value	18/12.7	89/94.3	107/107.0
	Nationality	16.8%	83.2%	100.0%
	LDL	42.9%	28.4%	30.1%
	Total	5.1%	25.1%	30.1%
Total	Observed/Expected Value	42/42.0	313/313.0	355/355.0
	Nationality	11.8%	88.2%	100.0%
	LDL	100.0%	100.0%	100.0%
	Total	11.8%	88.2%	100.0%

Male patients (≤40mg/dL)

X^2=30.83 (p=.00)		HDL		Total
		≤40mg/dL	>40mg/dL	
Korean	Observed/Expected Value	47/68.5	201/179.5	248/248.0
	Nationality	19.0%	81.0%	100.0%
	HDL	48.0%	78.2%	69.9%
	Total	13.2%	56.6%	69.9%
American	Observed/Expected Value	51/29.5	56/77.5	107/107.0
	Nationality	47.7%	52.3%	100.0%
	HDL	52.0%	21.8%	30.1%
	Total	14.4%	15.8%	30.1%
Total	Observed/Expected Value	98/98.0	257/257.0	355/355.0
	Nationality	27.6%	72.4%	100.0%
	HDL	100.0%	100.0%	100.0%
	Total	27.6%	72.4%	100.0%

Female patients (≤50mg/dL)

X^2=1.71 (p=.19)		HDL		Total
		≤50mg/dL	>50mg/dL	
Korean	Observed/Expected Value	31/34.9	217/213.1	248/248.0
	Nationality	12.5%	87.5%	100.0%
	HDL	62.0%	71.1%	69.9%
	Total	8.7%	61.1%	69.9%
American	Observed/Expected Value	19/15.1	88/91.9	107/107.0
	Nationality	17.8%	82.2%	100.0%
	HDL	38.0%	28.9%	30.1%
	Total	5.4%	24.8%	30.1%
Total	Observed/Expected Value	50/50.0	305/305.0	355/355.0
	Nationality	14.1%	85.9%	100.0%
	HDL	100.0%	100.0%	100.0%
	Total	14.1%	85.9%	100.0%

TC; total cholesterol, TG; triglyceride, LDL; low-density lipoprotein cholesterol, HDL; high-density lipoprotein cholesterol

Where, P (Korean) represents the probability that it will be Korean characteristics, P (American) is the probability that it will be American Characteristics, BF is % of body fat, SBP is systolic blood pressure, DM is diabetes mellitus, SM is smoking. For variable selection, the study used backward stepwise elimination method to eliminate variable with the lowest likelihood ratio in order. TC, Non-HDL, heart rate, SBP, and DBP were omitted in this process to finally make the best model presented below.

$$Z = 28.690 - .048\ (age) - .056\ (\%body\ fat) - .150\ (HDL) - 4.141\ (TC/HDL) + .020\ (TG) + .064\ (LDL) - .352\ (BMI) - .676\ (smoking) + .991\ (DM)$$

BMI is body mass index. It can see the coefficient of each factor (B) and its odds ratio in Table 6. Odds ratio (OR) is represented as OR=EXP (B). According to the regression model in this study, the probability to be a Korean characteristic increased as the odds ratio was more

Table 6. Logistic Regression for Discriminating Characteristics of Two Groups

Factor	B	S.E.	Statistics	DF	p-value	Exp (B)	95% Confidence Interval	
							Lower	Upper
Age	-.05	.02	5.43	1	.02	.95	.92	.99
%BF	-.06	.03	3.79	1	.05	.95	.89	1.00
HDL	-.15	.03	24.74	1	.00	.86	.81	.91
TC/HDL	-4.14	.63	43.90	1	.00	.02	.01	.05
TG	.02	.01	16.58	1	.00	1.02	1.01	1.03
LDL	.06	.01	25.25	1	.00	1.07	1.04	1.90
BMI	-.35	.07	28.40	1	.00	.70	.62	.80
Smoking	-.68	.41	2.69	1	.10	.51	.23	1.14
DM	.99	.51	3.75	1	.05	2.69	.99	7.35
Constant	28.69	3.72	59.62	1	.00			

BF; Body fat, HDL; high-density lipoprotein cholesterol, TC; total cholesterol, TG; triglyceride, LDL; low-density lipoprotein cholesterol, BMI; Body mass index, DM; diabetes mellitus

than 1. On the other hand, as the odds ratio became below 1, it indicated the probability of being an American characteristic increased. The factors with an odds ratio above 1 were TG, LDL, DM and other factors like Age, BF, HDL, TC/HDL, BMI, and smoking had an odds ratio that was below 1. The odd ratio of 2.694 for the existence of DM is the most outstanding to discriminate as a Korean characteristic. This means the probability to be discriminated as a Korean is 2.694 times higher than it would be for American patients, while the odds ratio of .016 for TC/HDL refers to probability to be discriminated as a Korean characteristic was very low. TC/HDL is the more contributable factor to discriminate patients as American.

Ⅳ. Discussion

CAD prevalence in Korea rapidly increased by the end of 1990's. It indicates specific factors or conditions might have caused CAD to be accelerated at that time. Both Korean and American patients randomly collected in this study showed a similar mean age range, the late fifties for men and sixties for women. The age both in male and female was not statistically different between Korean and American. It confirms advancing age is associated with CAD risks and the prevalence spurts in general after 50.

American patients in both genders were taller and heavier than the Korean counterparts. It could be due to the racial difference (Table 1). However, the BMI was much higher in American patients meaning they were heavier comparing to their height than Korean patients were. The mean value of BMI indicated American patients in both genders were classified as obese, while Korean patients in both genders were classified as overweight (Table 2) determined by looking at abdominal or visceral fatness (Cho et al., 2008). Percent body fat in American patients in both genders was also higher than that of Koreans implying diet might cause this difference between the two groups. The lifestyle of Korean patients, especially diet pattern, is not likely to cause obesity as well as hyperlipidemia (Kang et al., 2004).

In terms of blood lipid profile, all the variables except HDL showed significantly higher level in American patients. Among the lipid, variables mean value of TG in both American male and female exceeded the borderline for metabolic syndrome risk, e.g. 150mg/dL (167.11± 82.71mg/dL for men, 184.74±94.35mg/dL for women) (Table 2). X^2-test showed higher percentage of borderline-

over blood lipid in American patients. It may be due to a popularity of high-fat diet in America and made high blood lipid a major CAD risk factor.

Interestingly Korean patients, especially in males, showed much higher level in HDL than Americans. Also, Korean male patients whose HDL level was below 40mg/dL were less than American male patients, but not different in female patients (Table 2) (Dey et al., 2002; Lee et al., 2011). It is well known that regular exercise and vigorous physical endeavor increase the level of HDL. However, due to lack of information about both groups' exercise and/or physical activity history, a conclusion could not be met for this perspective. Therefore, the possible assumption for this result may be associated with alcohol drinking. Alcohol is considered to be somewhat effective to raise the level of HDL (Paik and Choi, 1995). Both subjective observation and objective data showed drinking was more popular amongst Koreans, especially in Korean males. Organization for Economic Co-operation and Development (OECD) data showed continuous larger alcohol consumption amount in Koreans than Americans from 1991 to 2012 (OECD, 2016a).

The OECD data from 1992 to 2014 showed much higher smoking rates (% of population aged 15+ who are daily smokers) in the Korean population than American (OECD, 2016b). It was expected smoking would be a strong independent risk for discriminating Korean patients from American but logistic regression did not confirm smoking was the discriminative variables only for the Korean patients. In fact, there was no difference in the percentage of smokers between total Korean and American patients (Table 4). In female patients, percentage of smoking was quite different between two groups (Table 4). The much lower smoking rate in Korean female patient may be due to social atmosphere that suppressed women smoking. However, this study should consider second-hand smoking in Korean female patients, though it does not have any information. Considering higher smoking rate in Korean male it is reasonable to consider that many of Korean female patients may be exposed to and affected by second hand smoking due to having spouse who smokes. If the study had investigated the effects of a spouse smoking, the result of Korean female may have been changed.

SBP was one of the variables that were statistically higher in Americans than in Koreans even though DBP was not different between them. This result is interesting because high blood pressure at the age of the Korean patients had traditionally been a problematic major risk factor for cardio-and-cerebrovascular disease (Lee et al., 1998). Despite having a plant-based diet, the problem with Korean meals is that it is sodium-rich. This diet habit could lead to chronic hypertension (Song et al., 2013). It is difficult to explain why American patients showed statistically higher blood pressures unless the lifestyles of the two groups were examined in more detail.

While American female patients had a slightly higher percentage of diabetes than Korean females, Korean male patients showed a higher percentage than American male, making the total prevalence in DM higher than American though it is not statistically significant. Studies regarded diabetes mellitus as a prime risk factor of ischemic heart disease in Korea (Cheon, 1995). It is difficult to explain the etiologic difference of DM between the two groups. Many Koreans the same age as the patients in this study were more likely to have a type II DM, what is referred to as the "thin DM" in Korea.

In logistic regression, odds ratio of most variables found were either near or not far from number 1, showing these variables were not likely to be a discriminant risk factor for both sides. TC/HDL was the only factor that could be used to discriminate Americans from Korean in this study, while DM was the only factor for discriminating Korean patient from their American counterparts. In other words, TC/HDL and DM were most outstanding independent risk factors for American and Korean CAD patients respectively. These results align with the result

of other statistics that were used in the study (Kim et al., 1992; Lee et al., 2002; American Heart Association, 1999; Lamarche et al., 1995).

Ⅴ. Conclusion

The characteristic of CAD risk factors was different between Korean and American in this study. TC/HDL was a discriminant factor for the American patients while the discriminant factor for Korean patients was DM. This result also implies that DM should be given attention to prevent CAD in current Korean adults. However, CAD risk factors are susceptible to change due to generational changes. It is true especially during the transition phase from developing countries to economically advanced countries not only because of economic growth, but due to accepting foreign culture and changing of lifestyle. Additional risk factors from this change may surpass their ethnographic risk factors. Therefore, it is important to anticipate main risk factors for the future generations.

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