



A relationship between Stroke and Sasang Constitution in Korean

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SUMMARY

Experts of Sasang Constitution Medicine of Traditional Korean Medicine have classified stroke patients with four types of Sasang constitutions in their clinical practice and some types of Sasang constitutions have been regarded as risk factors of stroke, but this is uncertain because there were no evidences by large scale of prospective studies. The purpose of this was to study the association between strokes and Sasang constitutions. Case-control study has been conducted to the patients admitted to the research hospitals. The patients were confirmed stroke by brain MRI or CT scans and recruited from May 2003 to August 2005. The subjects who met the requirement of inclusion and exclusion criteria were 108 patients as the cases and 107 as healthy controls. Data collection has been performed by the trained specialists majoring neurologists through interviews, physical examinations, and laboratory testes. No statistical significance was obtained between the strokes and Sasang constitutions, yet *Taemin*, and *Soyangin* types showed a trend of increase in the incidence of strokes as compared with *Soeumin*. To acquire more concrete data on this theme, we need further and large scale of prospective researches.

Key words: Stroke; Sasang Constitution; Case-control study; Korean

INTRODUCTION

Stroke is well-known as a high prevalence, high cost, and variable practice pattern disease. It is usually accompanied by poor clinical outcome and also managed by a non-integrated healthcare system (Venketasubramanian *et al.*, 2002). It has

been found to be the second largest cause of death and a leading cause of chronic disability and morbidity among Korean (Ko, 2003). Considering relatively high income level of Korea and the negative correlation between stroke mortality and social economic status among nations, current high stroke mortality rate in Korea can be due to prevalent risk factors for, inadequate treatment (or prevention) of stroke, or both at the same time (Kim *et al.*, 1997). Despite of the recent improvement in the death rate caused by stroke, it still remains as the second largest leading cause of the death

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(Korea National Statistical Office, 2003). A major branch of traditional medicine of Korea, the Sasang Constitutional Medicine (SCM), classifies people's constitutions into four distinct groups according to the strengths and weaknesses in functions of the internal organs, nature, emotions, and etc (Um *et al.*, 2003). *Sasang Constitution* distinguishes the clinical examinations and symptoms based upon its classification of patients with stroke. Disease susceptibility of individuals is presumed to differ depending on their personality traits (Chae *et al.*, 2003), which also leads to the presumption of possible linkage between constitution and stroke. Risk factor for each cerebrovascular disease should be assessed in different manner, because of differences in pathogenesis, prognosis, and treatments among strokes subtype.

Sasang Constitutional Medicine provides new approach for the treatment of patients with stroke. However, relationship between Sasang Constitution and stroke seems to be unclear yet. The purpose of our study is to analyze the relationship between stroke and Sasang Constitution among Korean in case-control environment.

MATERIALS AND METHODS

PAMOS study

The prevention and Management of Stroke (PAMOS) is a hospital-based case-control study that examines risk factors for stroke among Korean. PAMOS was conducted by the departments of neurology at three University Hospital located in different regions in South Korea from May 1, 2003 to August 31, 2005.

Selection of case subjects

Consecutive patients have been or admitted in a hospital between May 1, 2003 and August 31, 2005 with a stroke were recruited at 3 university hospitals according to the guidelines of the Institution Review Board.

Stroke is defined as the clinical syndrome of rapid onset of focal (or global) cerebral deficit,

lasting more than 24 h or leading to death, with no apparent cause other than a vascular one.

Outcomes were defined as primary discharge diagnosis, and when recurrent hospitalizations with the same code occurred, only the first event was selected. The study outcomes included ischemic stroke (ICD-8 codes 432 - 434 and 436 - 438 and ICD-9 codes 433 - 434 and 436 - 438), and hemorrhagic stroke (ICD-8 codes 430 - 431 and ICD-9 codes 430 - 432). The validity of ascertainment of stroke was diagnosed with either brain on a CT or magnetic resonance imaging (MRI) brain scan performed within 1 week of the event.

Case subjects were only included in the analysis if they had stroke symptoms, including visual, speech, motor, or sensory deficit, that persisted for 1 h and were present on arrival. In this study, case subjects with stroke are 107 persons and admitted within 1week from onset.

Selection of controls subjects

For each case, we recruited controls that for admitted patients. Control subjects have never been diagnosed with a stroke or stroke symptoms. When a subject was recruited, the objective of research was explained and surveyed briefly to record age, social economic status, life styles, anthropometric measurements, and conventional vascular disease risk factors.

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Index evaluation of cases and controls

We obtained the study parameters from all both cases; patients and control participants. Data

indicating the study parameters were collected by well-trained research assistants (internal medicine specialists educated for this study), through an interview, physical examination, and clinical pathological testes. We classified cases and controls subjects into four categories according to QSCC II program (Questionnaire for the Sasang Constitution Classification II) and clinical data (weight, higher, blood pressure, and etc: *Taeyangin*, *Soyangin*, *Taeumin*, and *Soeumin*).

QSCC II is a questionnaire program that provides objective classification of 4 constitutional types under computer environment, and is developed by the department of Sasang Medicine in Kyunghee University, Oriental Medicine Hospital in Seoul. The questionnaire is subdivided into four sections where each section asks for different aspects of the subject: the first asks for general mental and behavioral characteristics; the second, personal, business, and social lives, the third, physical characteristics; and the fourth and last, some general questions on health. We also surveyed Body Mass Index (BMI), family history of stroke, past history of hypertension and diabetes mellitus, smoking habits, alcohol consumption, meat and vegetable intake, systolic and diastolic blood pressures, fasting blood sample for lipid, glucose, and cholesterol level. BMI was computed as weight (kg) divided by height squared (m^2). History of physician diagnosed hypertension or diabetes mellitus, use of antihypertensive medication, insulin, or oral hypoglycemic agents were ascertained by interview or prescription of patients. Hypertension was defined as systolic blood pressure 140 mm Hg and diastolic blood pressure 90 mm Hg or self-reported physician diagnosed hypertension or use of antihypertensive therapy. Diabetes mellitus was defined by self-reported physician-diagnosed diabetes, random blood glucose 200 mg/dl, or use of insulin or oral hypoglycemic agents.

Discrimination of Sasang Constitution

Lee Je-Ma is known to establish the Sasang

Constitutional Medicine in 1894, which we examine in this study. Lee Je-Ma not only classified human according to their figure and nature by recognizing that “if there is anything, then there is a law to explain and to have solution” but also claimed that Sasang is the most basic and proper concept to explain what exists and how they change (Lee, 2003).

The Sasang Constitution Medicine have been developed as one of major branches in traditional medicine of Korea, which is now recognized as another pillar of patient treatment along with western medicine in Korea. The nature and the emotion is considered as Sorrow, Anger, Joy, and Pleasure, of which also lead to the classification of *Taeyangin*, *Taeumin*, *Sotangin*, *Soeumin* accordingly. The congenital difference is believed to affect in the divergence in behavior, lifestyle, disease resistance, and other human affairs. First, the Sasang Constitutional Medicine regards human being as a existence should be polish his nature with the moderation of the learning and speculation without self-abandonment though his nature was endowed. Second, Sasang Constitutional Medicine is known to utilize the mind treatment to treat the patient. The control of the knowledge and deed based on the Confucianism is used to transfer the health of mind into that of physiology and physics. Third, the Sasang Constitutional Medicine is regarded as a social medicine with the moderation control of Overdrinking-Sexual pleasure-Wealth-Social power and adhered meditation and emphasizes behavior with the liking the good and disliking the bad. So, *Sasang Constitutional Medicine* has cure with mind and body. Please see Table 1 for specific characteristics of each group (Ahn, 1999). General features of 4 constitutional body types can be found in Table 2.

Statistical analysis

We initially obtained descriptive univariate statistics of the study according to the presence or absence of stroke then identified association between *Sasang Constitution* and risk factors of stroke using

Table 1. Characteristics of sasang constitution

Group	Characterisitcs
<i>Taeyangin</i>	The <i>Taeyangin</i> groups always want to be heroic and have such high self-esteem that when things go wrong for them, they will be incensed and hurt themselves.
<i>Taeumin</i>	The <i>Taeumin</i> groups are well-mannered, are willing to correct themselves and try to be fair. They are reticent, quiet and shrewd at calculating loss and gain. Once they get into something, they persevere in their efforts to achieve it and often succeed well.
<i>Soyangin</i>	The <i>Soyangin</i> group is bold, impatient and superficial. They always prefer to be out and ignore their own business or home. Though they are agile and shrewd, they are disorganized and give up readily.
<i>Soeumin</i>	The <i>Soeumin</i> group's act is natural, neat and tactful. They show an obedient and courteous attitude. They are introverted, timid and affable. They seem to be meek and unpretentious but in fact they are strong-willed, organized, and meticulous.

Table 2. General features of the four sasang constitution (Traditional Korean Medical Typology)

	<i>Taeyangin</i>	<i>Soyangin</i>	<i>Taeumin</i>	<i>Soeumin</i>
Nature	Sorrow	Anger	Gladness	Enjoyment
Developed organ	Lung	Spleen	Liver	Kidney
Undeveloped organ	Liver	Kidney	Lung	Spleen
Character	Creative Positive Progressive Charismatic Heroic Rash mind	Unstable Easily get board Sacrificing Righteous Easily acceptable Hot tempered Anxious mind	Gentle Commercial Endurable Humorous Look foolish Coward Fearful mind	Neat, mild Negative Intelligent Organized Selfish Jealous Persistent Nervous mind
Body shape	Developed nape of the neck, slender waist	Developed chest, small hips	Thick waist, weak nape of the neck	Developed hip, weak chest
Healthy sign	Urination	Bowel movement	Perspiration	Digestion
Unhealthy sign	Bubbles in mouth, emesis	Constipation	No perspiration	Indigestion

chi-square tests or ANOVA. The relative risk, defined as the ratio of the risk for developing stroke in the presence of a factor to the risk in the absence of that factor, was estimated by the odds ratio. Four types of adjusted associations between *Sasang Constitution* and stroke were determined using the logistic regression model. For the logistic regression analysis, model 1 included only independent variables and age; model 2 in addition to diet factors, model 3 included all of the variables in model 2 as well as conventional vascular risk factors, and model 4, in addition to diet factors, conventional vascular risk factors and LDL/HDL ratio. Trends of odds ratios were assessed by a test for linear trend in the log odds ratios.

RESULTS

The basic characteristics of the 108 stroke patients and the 107 controls are shown Table 3. There was no significant difference in age and sex distribution between case and the controls respectively. Family history of stroke, systolic and diastolic blood pressure, and LDL/HDL ratio were higher among case subjects, while control subjects had higher education level. Cases and controls do not significantly differ in their means in smoking and drinking frequency, dietary habit, marital status, religion, regular exercise, and body mass index.

As mentioned before, we classified subject accordingly with Sasang constitutional classification

Table 3. Distribution of basic characteristics of cases and controls

	Variable	Control (n = 107)	Case (n = 108)	P value
Constitution	<i>Taeumin</i>	50 (23.3)	54 (25.1)	0.350
	<i>Soeumin</i>	24 (11.2)	16 (7.4)	
	<i>Soyangin</i>	33 (15.3)	38 (17.7)	
Sex (n, %)	Male(n = 103)	48 (22.3)	55 (25.6)	0.373
	Female(n = 112)	59 (27.4)	53 (24.7)	
Age (n, %)	45 - 49 age	21 (9.8)	15 (7.0)	0.113
	50 - 59 age	31 (14.4)	20 (9.3)	
	60 - 69 age	30 (14.0)	38 (17.7)	
	70 age over	25 (11.6)	35 (16.3)	
Smoking	never	59 (27.4)	54 (25.1)	0.528
	past	14 (6.5)	20 (9.3)	
	current	34 (15.8)	34 (15.8)	
Alcohol drinking (n, %)	never	50 (23.3)	52 (24.2)	0.134
	past	10 (4.7)	19 (8.8)	
	current	47 (21.9)	37 (17.2)	
Dietary Habit (n, %)	meat preference	17 (7.9)	22 (10.2)	0.692
	vegetable preference	35 (16.3)	34 (15.8)	
	Both	55 (25.6)	52 (24.2)	
Family History of Stroke (n, %)	no	88 (40.9)	73 (34.0)	0.013
	yes	19 (8.8)	35 (16.3)	
Marital Status	current married	80 (37.4)	79 (36.9)	0.705
	separation by death	20 (9.3)	24 (11.2)	
	others	7 (3.3)	5 (2.3)	
Religion (n,%)	no	54 (25.1)	47 (21.9)	0.307
	yes	53 (24.7)	61 (28.4)	
Regular Exercise (n,%)	no	70 (32.6)	75 (34.9)	0.529
	yes	37 (17.2)	33 (15.3)	
Education Level (n,%)	no education	21 (9.8)	20 (9.3)	0.009
	6 years educated(≡ primary school)	27 (12.6)	44 (20.5)	
	9 years educated(≡ junior high school)	8(3.7)	16 (7.4)	
	12 years educated(≡ senior high school)	33(15.3)	19 (8.8)	
	12 years over educated(≡ college over)	18(8.4)	9 (4.2)	
BMI (kg/m ² , n, %)	< 25	58(27.0)	63 (29.3)	0.542
	≥ 25	49(22.8)	45 (20.9)	
	systolic blood pressure (mmHg, mean ± SD)	132.10 ± 19.05	144.91 ± 20.98	< 0.001
	diastolic blood pressure (mmHg, mean ± SD)	86.02 ± 11.41	92.69 ± 13.09	< 0.001
	low density lipoprotein (mg/dl, mean ± SD)	106.59 ± 42.77	116.46 ± 38.75	0.095
	high density lipoprotein (mg/dl, mean ± SD)	47.69 ± 10.28	45.92 ± 20.67	0.466
	atherogenic index	2.33 ± 0.96	2.81 ± 1.19	0.003
	triglyceride (mg/dl, mean ± SD)	135.54 ± 98.9	148.98 ± 95.50	0.330

P value of Chi-square test, student t-test. BMI: Body Mass Index. Non obese < 25 kg/m², obese ≥ 25 kg/m². Atherogenic index = Low density lipoprotein cholesterol/High density lipoprotein cholesterol.

using QSCC II program, and they are identified as *Taeyangin*, *Taeumin*, *Soyangin*, and *Soeumin*.

We found cases to be distributed in each classification in following manner; *Taeyangin* with 0 (0%), *Taeumin* with 24 (25.1%), *Soyangin* with 38 (17.7%), and *Soeumin* with 16 (7.4%). On the other, controls were distributed as follows; *Taeyangin* with 0 (0%), *Taeumin* with 50 (23.3%), *Soyangin* with 33 (15.3%), and *Soeumin* with 24 (11.2%). As in another studies that was found the frequency of the *Taeyangin* to be extremely low (0.03 - 0.1%), we also found *Taeyangin* with 0% while other three classification of *Taeumin*, *Soyangin*, and *Soeumin* are identified successfully. On the other hand, we found no significant difference in the distribution of cases and controls in Sasang constitutional classification.

We analyzed our data further, separately, identified association between Sasang Constitution and risk factors of stroke. As *Taeyangin* only takes 0% in each sample of cases and controls, participants were divided into three groups, *Soeumin*, *Taeumin*, *Soyangin* group of distribution of cases and controls. No association was found for *Sasang Constitution* and risk factor of stroke except BMI and triglyceride level of *Taeumin* group is significantly higher than the other two groups. For more statistical results, please refer to Table 4.

In Table 5, the variable of *Sasang Constitution* on the distributions among cases and controls, was adjusted separately with four models for analysis, for sex and age (Model 1), sex and age in addition to dietary habit (Model 2), Model 2 in addition to vascular factors(1), such as smoking status, drinking status, family history of stroke, religion status, martial status (Model 3) and Model 3 in addition to vascular factors(2) (Model 4), such as systolic and diastolic pressure, FBS, antherogenic index(low density lipoprotein cholesterol/high density lipoprotein cholesterol). Unadjusted for other risk factors, a risk effect was seen for stroke in patients with *Taeumin*, *Soyangin* (OR, 1.62, 1.73; 0.77 ~ 3.40, 0.79 ~ 3.79, respectively).

In multivariable analysis, positive but no statistically significant associations were found for 4 types of model which adjusted for sex, age (Model 1), sex and age plus dietary habit (Model 2), adjusted for sex, age, diet factors and vascular factors(1), such as smoking status, drinking status, family history of stroke, religion status, martial status (Model 3), and adjusted for sex, age, diet factors, vascular factors(1), and vascular factors(2) (Model 4), such as systolic and diastolic pressure, FBS, antherogenic index (low density lipoprotein cholesterol/high density lipoprotein cholesterol), were not significant, but it shown the risk trends.

DISCUSSION

Personality trait is the characteristic style of an individual's behavioral tendency, often incorporating temperament, pattern of behavior, and the accompanying emotional expression (Loehlin, 1992). Also, it is thought to be closely associated with specific body shape and features. Because disease vulnerability and drug reaction are presumed to be potentially different according to such traits, a number of studies have been conducted to examine the relationship between personality traits and susceptibility to pathology or drug response, with the ultimate goal of achieving a more personalized medicine (Ebstein *et al.*, 2000; Kaasinen *et al.*, 2001; Nowotny *et al.*, 2001).

In spite of the recent remarkable development in both western and oriental medical sciences, there is still only shallow understanding of individual differences for various prognoses of incurable diseases and immunopathy diseases. Nowadays there are a lot of attempts and approaches in the study of oriental medicine. The morph and image is one of them, and its importance is more and more increasing. Likewise, in the Sasang Constitutional Medicine, the morph and image is one of the important parts, too (Kim *et al.*, 1999).

Sasang Constitutional Medicine also utilizes the herbs found in Traditional Chinese Medicine, but

Table 4. General characteristics and conventional vascular risk factors by sasang constitution

	Variable	Taeumin	Soeumin	Soyangin	P value
Sex (n, %)	Male (n = 103)	49 (22.8)	19 (8.8)	35 (16.3)	0.959
	Female (n = 112)	55 (25.6)	21 (9.8)	36 (16.7)	
Age (n, %)	45 - 49 age	20 (9.3)	5 (2.3)	11 (5.1)	0.825
	50 - 59 age	25 (11.6)	8 (3.7)	18 (8.4)	
	60 - 69 age	30 (14.0)	13 (6.0)	25 (11.6)	
	70 age over	29 (13.5)	14 (6.5)	17 (7.9)	
Smoking	never	53 (24.7)	23 (10.7)	37 (17.2)	0.930
	past	18 (8.4)	6 (2.8)	10 (4.7)	
	current	33 (15.3)	11 (5.1)	24 (11.2)	
Alcohol drinking (n, %)	never	47 (21.9)	21 (9.8)	34 (15.8)	0.905
	past	16 (7.4)	4 (1.9)	9 (4.2)	
	current	41 (19.1)	15 (7.0)	28 (13.0)	
Dietary Habit (n, %)	meat preference	26 (12.1)	4 (1.9)	9 (4.2)	0.240
	vegetable preference	27 (12.6)	15 (7.0)	27 (12.6)	
	Both	51 (23.7)	21 (9.8)	35 (16.3)	
Family History of Stroke (n, %)	no	79 (36.7)	28 (12.0)	54 (25.1)	0.732
	yes	25 (11.6)	12 (5.6)	17 (7.9)	
Marital Status	current married	76 (35.3)	28 (13.0)	55 (25.6)	0.405
	separation by death	24 (11.2)	10 (4.7)	10 (4.7)	
	others	4 (1.9)	2 (0.9)	6 (2.8)	
Religion (n, %)	no	50 (23.3)	23 (10.7)	28 (13.0)	0.178
	yes	54 (25.1)	17 (7.9)	43 (20.0)	
Regular Exercise (n, %)	no	67 (31.2)	29 (13.5)	49 (22.8)	0.613
	yes	37 (17.2)	11 (5.1)	22 (10.2)	
Education Level (n, %)	no	22 (10.2)	7 (3.3)	12 (5.6)	0.625
	primary school	33 (15.3)	15 (7.0)	23 (10.7)	
	middle school	8 (3.7)	3 (1.4)	13 (6.0)	
	high school	27 (12.6)	10 (4.7)	15 (7.0)	
	college and over	14 (6.5)	5 (2.3)	8 (3.7)	
BMI (kg/m ² , n, %)	< 25 (n = 121)	40 (18.6)	31 (14.4)	50 (23.3)	< 0.001
	≥ 25 (n = 94)	64 (29.8)	9 (4.2)	21 (9.8)	
systolic blood pressure (mmHg, mean ± SD)		138.36 ± 21.74	137.45 ± 20.66	139.41 ± 20.34	0.889
diastolic blood pressure (mmHg, mean ± SD)		90.62 ± 12.22	85.93 ± 11.55	89.54 ± 13.78	0.139
low density lipoprotein cholesterol (mg/dl, mean ± SD)		111.67 ± 41.49	114.11 ± 37.10	111.13 ± 42.37	0.939
high density lipoprotein cholesterol (mg/dl, mean ± SD)		46.29 ± 15.24	45.22 ± 9.80	48.20 ± 21.26	0.657
antherogenic index		2.57 ± 1.06	2.64 ± 1.00	2.58 ± 1.26	0.947
triglyceride (mg/dl, mean ± SD)		158.83 ± 112.35	139.66 ± 92.32	121.00 ± 67.81	0.047

P value of Chi-square test, student t-test. BMI : Body Mass Index. Non obese < 25 kg/m², obese ≥ 25 kg/m². Antherogenic index = low density lipoprotein cholesterol/high density lipoprotein cholesterol.

is different from Traditional Chinese Medicine in the following aspects (Lee *et al.*, 2001). First,

Traditional Chinese Medicine is based on Taoism and explains the universe with Yin-Yang theory,

Table 5. Association of sasang constitution with other risk factors

	<i>Soeumin</i>	<i>Taeumin</i>	<i>Soyangin</i>
	1	1.62 (0.77 - 3.40)	1.73 (0.79 - 3.79)
Sex, Age	1	1.82 (0.85 - 3.88)	1.90 (0.85 - 4.25)
Sex, Age + dietary habit	1	1.75 (0.81 - 3.77)	1.89 (0.84 - 4.24)
Sex, Age + dietary habit + vascular risk factor c	1	1.78 (0.81 - 3.93)	1.91 (0.83 - 4.42)
Sex, Age + dietary habit + vascular risk factor c + vascular factor d	1	1.67 (0.63 - 4.37)	1.96 (0.70 - 5.45)

Model 1: The odds ratio adjusted for sex and age; model 1 for adjustment; the 95% confidence interval is for this odds ratio. Model 2: The odds ratio also adjusted for sex, age and dietary habits. Model 3: The odds ratio also adjusted for sex, age, diet factors and vascular factors (1), such as smoking status, drinking status, family history of stroke, religion status, and martial status. Model 4: The odds ratio also adjusted for sex, age, diet factors, vascular factors (1), and vascular factors (2), such as systolic and diastolic pressure, FBS, antherogenic index (low density lipoprotein cholesterol/high density lipoprotein cholesterol).

and the five-phase idea. In contrast, the Sasang typology is based on the combination of Neo-Confucianism and the medical tradition of Korea, and describes nature as quaternary. Traditional Chinese Medicine places importance on the harmony between humanity and nature, whereas Sasang Constitutional Medicine emphasizes the harmony in social life and developing one's character. Therefore, Sasang Constitutional Medicine has a sociologic as well as a biologic facet.

The constitutional view of the human being; there are four types of human beings based upon the congenital formation of the organ, made by the difference of the nature and the emotion, which is the same concept with the mind. The care, cure and prevention methods of Sasang Constitutional Medicine are broadly used as an effective treatment of incurable diseases like stroke, immunopathy diseases and stress-related diseases due to aging.

The Sasang Constitutional Medicine has that tendency of nature and emotion made the cause of disease. According to the oriental medicine, the causes of stroke are wind, fire, and heat. It is similar that the symptoms of stroke are mainly belonging to heat in Sasang Constitutional Medicine. But in Sasang Constitutional Medicine, the cause of stroke was also originated from the tendency of nature and emotion and unbalanced attitudes. There was description of the causes classified by

Sasang Constitution in *«Dongyi Suse Bowon»*.

Taeumin's stroke is liver dryness-heat symptoms one of the symptoms in *Taeumin* marked by great thirst, copious urination and constipation. *Soyangin's* stroke is interior febrile disease induced from the stomach affected by heat one of the symptoms in *Soyangin* marked by constipation and fever without chills. *Soeumin's* stroke is exterior febrile disease induced from the Kidney affected by heat one of the symptoms in *Soeumin* marked by fever with chills. It is divided into two types, which is *Ulgwang* syndrome and *Mang-yang* syndrome. *Soyangin's* stroke is diagnosed as the category of internal disease, and it was more difficult for cure than the other constitutions. After mental stabilization through recuperation, there was needed medication in *Soyangin*.

In stroke patients, the clinical examinations and symptoms of stroke were different by Sasang Constitution. For instance, in problems related with 'Chest region', *Soyangin* stroke group easily feel choked up and *Taeumin* group heart throbs. In problems related with 'The condition of digestion', *Taeumin* stroke group have a good appetite and more complaint in lower abdominal region, but on the contrary *Soyangin* stroke group lose appetite and have more complaint in upper abdominal region. An absolute bed rest is an essential component of caring for stroke patients of *Soyangin*, but not for

other Sasang Constitution types. Because of differences in pathogenesis, prognosis, and treatments among stroke subtypes, risk factor assessment for each stroke should be performed separately. Sasang Constitutional Medicine is based on the diversity of human being and medically developed the response variation to disease and medicines. The diversity is categorized as a four group from physiology, pathology, symptoms, to therapy. So that is related the difference of individual characteristics in Western Science (Lee et al., 2000).

In the clinical research of stroke, the occurrence was different according to constitution. *Taeumin*, who resembled the typical abdominal type of obesity in Western populations, is thought to have a higher rate of stroke, hypertension and hyperlipidemia than the other types. According to reported studies, it seems like that stroke is more frequent at *Taeumin* than other constitutions. But considering the component ratio of the Sasang Constitution (*Taeumin* : *Soyangin* : *Soeumin* = 5 : 3 : 2) in « *Dongyi Suse Bowon* » and this report, there is not any correlation between stroke and Sasang Constitution. But our results showed that *Soyangin* have a higher probability of stroke than the other type. In multiple researches, the correlation of Sasang Constitution and stroke was not significant, but it shown the risk trends that increase in order of *Soeumin*, *Taeumin*, *Tayangin*. Considering the relatively small sample size used in this study, further studies using larger samples and representative populations are needed. If sample size is larger, the relationship of Sasang Constitution and stroke is clear in Korean. Despite its potential value in constructing personalized and integrative medicine traits of Sasang Constitution have not studied in a quantitative and scientific manner, barring their development and propagation to other countries and cultures. Considering the paucity of research studies in this area even with the advancements in research methodology, the Sasang Constitution is a systemic incarnation of medical typology that is poised to explain the influence of emotionality,

behavioral patterns and tendencies, and physical and physiologic characteristics in the treatment of a number of diseases. Many patients use alternative therapies (Blackmer et al., 2002). Sasang Constitutional medicine could be applicable to whole world people as well as Korean and Asian (Koh et al., 1999).

It has been reported that Sasang Constitutional Medicine is effective and safety in stroke (Choi et al., 1998; Park et al., 1998; Lee et al., 2001). In fact, it is reported that *yangkyuksanhwatang* (Jeong et al., 2002) in *Soyangin*, *chungpyesagan-tang* (Jung et al., 2003) in *Taeumin* and etc may have therapeutic effects, acting to reduce the severity of stroke and improving functional recovery without definite hepatic or renal toxicity. Sasang Constitutional Medicine is effective in stroke. The present study is an attempt to evaluate the efficacy of Korean traditional oriental medicine.

Several important limitations of this study should be considered. First, our study was a case-control study rather than prospective cohort study. The hospital-based approach of this case-control study design matched by age and sex, help to minimize the potential biases often associated with case-control studies. Some control selection bias could have existed, but the distribution of Sasang Constitution was similar to other study distribution in Korea. Second, QSCC has limitation to find out constitution. The diagnostic discrimination abilities of the QSCC is 60.3% about *Taeumin* (Jang et al., 2001), 64.3% about *Soeumin* (Kim et al., 2000) and can't find *Tayangin*. And its average is 70.08% (Lee et al., 1996). So, if the accuracy of Sasang Constitution diagnosis is higher, we should use variable program by way of PSSC-2004 which is analyzed by voices in Sasang Constitution besides QSCC II. We hope that suitable questionnaire and program will be developed for accuracy.

In summary, our results showed that constitutional correlation in the Sasang Constitution had non-significant increasing risk of stroke when unadjusted and adjusted for all models of adjustment. More data from prospective cohort studies will help to

distinguish whether the Sasang Constitution has an association true risky biological effect or serve as a surrogate for a risk profile promoting.

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