Risk factors for familial and nonfamilial young ischemic stroke

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Aim
In this study, the authors presented the 10-year survey on risk factors among young patients with ischemic stroke according to their family history.
Patients and methods
The population includes 92 young patients with ischemic stroke who had been admitted at Neurology Department of Pyongyang Medical College Hospital, Kim Il Sung University, between January 2007 and August 2016. Among them, young patients with familial history of ischemic stroke were 34 (11 females and 23 males), with a mean age of 38.9±3.54 years, and nonfamilial ones were 58 (13 females and 45 males), with mean age of 37.5±4.21 years (18–44 years old).
Results
Young patients with familial history of ischemic stroke with 5–10 risk factors were more than nonfamilial group, but young patients with nonfamilial ischemic stroke with 10–15 risk factors were more than familial group. Moreover, the effect of each risk factor is different in the two groups.
Conclusion
Incidence of young ischemic stroke is different between familial and nonfamilial groups, and nonfamilial patients have more risk factors than familial ones.

Keywords:
familial, risk factor, stroke, young

Introduction

The incidence of ischemic stroke increases with age, and the prevalence of stroke in young is very low. However, it causes socioeconomical disabilities in young adults.

Ischemic stroke is a multifactorial disease, and individuals with predisposition are quite vulnerable to risk factors. While emphasizing the importance of genetics, it was proven that there is a difference of incidence in familial and nonfamilial young ischemic stroke. 'Stroke in young' often has impression of genetic disease [1].

Patients and methods

The study was designed on retrospective data. We had the approval of the ethics committee of Pyongyang Medical College, Kim Il Sung University. The population includes 92 young patients with ischemic stroke (<45 years old) who had been admitted at Neurology Department of Pyongyang Medical College Hospital, Kim Il Sung University, between January 2007 and August 2016.

We obtained data from database of the hospital. The patients were diagnosed with confirmed CT and MRI. Young patients with familial history of ischemic stroke comprised 34 (11 females and 23 males) with a mean age of 38.9±3.54 years and non-familial ones comprised 58 (13 females and 45 males), with a mean age of 37.5±4.21 years (18–44 years old).

We selected 100 relatively healthy young people (<45 years old) as a control group.

Sex distribution is shown in Table 1.

We identified the risk factors for young ischemic stroke among the selected patients [2–8].

The risk factors for ischemic stroke are 17 in all: nonmodifiable (sex and season), modifiable (smoke, coffee, snack, sedentary job, night shift, obesity, and alcohol abuse), and medical diseases [hypertension, atrial fibrillation, dyslipidemia, diabetes mellitus (DM), past history of transient ischemic attack (TIA), migraine, sleep apnea syndrome (SAS), and dental caries] [2–9].

P value and confidence interval values were considered to demonstrate significantly different rates.

Table 1 Sex distribution of ischemic stroke in young patients

	Family history	All	Male	Female
Patients with ischemic stroke	Yes	34	23	11
	No	58	45	13
Healthy young adults	Yes	50	28	22
	No	50	26	24

Table 2 Risk factors for ischemic stroke in young patients

Nonmodifiable	Modifiable	Medical diseases
Sex	Smoke	Hypertension
Season	Coffee	Atrial fibrillation
	Snack	Dyslipidemia
	Sedentary job	Diabetes mellitus
	Night shift	Past history of transient ischemic attack
	Obesity	Migraine
	Alcohol abuse	Sleep apnea syndrome
		Dental caries

Statistical analysis

All data were analyzed with SPSS 18.0 (IBM, New York, USA).

Results

The study included 92 young patients with ischemic stroke (<45 years old) and 100 relatively healthy young adults (<45 years old).

Among young patients with ischemic stroke, there are 34 patients with family history of ischemic stroke and 58 patients without family history, and there are 50 individuals each in the healthy group (Table 1).

We identified 17 risk factors for ischemic stroke in 92 young patients with ischemic stroke. For convenience, the risk factors are divided into three groups: nonmodifiable (sex and season), modifiable (smoke, coffee, snack, sedentary job, night shift, obesity, and alcohol abuse), and medical diseases (hypertension, atrial fibrillation, dyslipidemia, DM, past history of TIA, migraine, SAS, and dental caries). The risk factors are shown in Table 2.

Each young patient with ischemic stroke has a different number of ischemic stroke that we identified. Moreover, on an average, young patients with non-familial ischemic stroke have more risk factors than young patients with familial ischemic stroke. The distribution of risk factors in familial and nonfamilial group is shown in Table 3.

Table 3 Distribution of risk factors in familial and non-familial young ischemic stroke groups

Number of risk factors	~5 [*n* (%)]	5–10 [*n* (%)]	10–15 [*n* (%)]	15 or more [*n* (%)]	all
Familial	1 (2.94)	18 (52.94)*	11 (32.35)	4 (11.76)	34
Nonfamilial	3 (5.17)	17 (29.31)	35 (60.34)*	3 (5.17)	58

*$P<0.05$.

Table 4 Risk factors in familial young ischemic stroke group

Risk factors	OR (95% CI)	*P*
Past history of TIA	4.49 (1.12–6.54)	<0.01
Hypertension	2.70 (1.09–3.21)	<0.05
Obesity	2.64 (1.12–3.11)	<0.05
Smoke	2.06 (1.05–2.86)	<0.05
Alcohol abuse	2.01 (1.11–2.77)	<0.05
Dental caries	1.89 (1.07–2.57)	<0.05
Sex	1.64 (1.04–2.11)	<0.05
Atrial fibrillation	1.48 (1.10–1.98)	<0.05
Dyslipidemia	1.44 (1.02–1.89)	<0.05
Snack	1.37 (1.09–1.79)	<0.05
SAS	1.36 (1.07–1.71)	<0.05
DM	1.32 (1.08–1.69)	<0.05
Coffee	1.18 (1.12–1.45)	<0.05
Season	1.17 (1.01–1.33)	<0.05
Sedentary job	1.16 (1.09–1.32)	<0.05
Migraine	1.13 (1.02–1.29)	<0.05
Night shift	1.06 (1.09–1.20)	<0.05

CI, confidence interval; DM, diabetes mellitus; OR, odds ratio; TIA, transient ischemic attack.

Young patients with familial ischemic stroke with 5–10 risk factors were significantly more than nonfamilial group ($P<0.05$), but young patients with nonfamilial ischemic stroke with 10–15 risk factors were significantly more than the familial group ($P<0.05$).

This result shows the young patients with ischemic stroke having a family history are likely to have less risk factors.

In familial and nonfamilial groups, we analyzed the effect of risk factors respectively according to odds ratio (OR), and we found some differences in the effect of risk factors for two groups.

All the risk factors that we identified were significant ones ($P<0.05$).

The order of risk factors in familial group is shown in Table 4 according to OR. The strongest risk factor was past history of TIA (OR=4.49, 95% confidence interval=1.12–6.54, $P<0.01$) and the rest comprised hypertension, obesity, smoking, alcohol abuse, dental caries, sex, atrial fibrillation, dyslipidemia, snack, DM, coffee, season, sedentary job, migraine, and night shift.

Table 5 Risk factors in nonfamilial young ischemic stroke group

Risk factors	OR (95% CI)	P
Past history of TIA	3.32 (1.08–5.32)	<0.01
Sex	3.2 (1.06–5.21)	<0.01
Obesity	3.01 (1.11–4.87)	<0.01
Smoking	2.95 (1.12–4.65)	<0.01
DM	2.87 (1.09–4.33)	<0.05
Dyslipidemia	2.71 (1.23–4.01)	<0.05
Alcohol abuse	2.56 (1.04–3.98)	<0.05
Hypertension	2.54 (1.09–3.72)	<0.05
Atrial fibrillation	2.19 (1.13–2.46)	<0.05
Night shift	1.99 (1.09–2.31)	<0.05
Coffee	1.89 (1.07–2.22)	<0.05
Snack	1.66 (1.09–1.97)	<0.05
Dental caries	1.54 (1.03–1.88)	<0.05
SAS	1.53 (1.05–1.79)	<0.05
Migraine	1.43 (1.08–1.71)	<0.05
Sedentary job	1.33 (1.05–1.45)	<0.05
Season	1.23 (1.08–1.32)	<0.05

CI, confidence interval; DM, diabetes mellitus; OR, odds ratio; SAS, sleep apnea syndrome; TIA, transient ischemic attack.

Moreover, the order of risk factors in nonfamilial group is shown in Table 5 according to OR. The strongest risk factor was also history of TIA (OR=3.32, 95% confidence interval =1.08–5.32, $P<0.01$), and the rest comprised sex, obesity, smoking, DM, dyslipidemia, alcohol, hypertension, atrial fibrillation, night shift, coffee, snack, dental caries, SAS, migraine, sedentary job, and season.

We found variation in the OR for ischemic stroke risk factors in the two groups of young patients with ischemic stroke.

Discussion

By using the available data registered in our hospital, we tried to evaluate risk factors involved in young patients with familial and nonfamilial ischemic stroke.

The incidence of ischemic stroke among young individuals is very low: 2.4/100 000 in 20–24 years old, 2.5/100 000 in 30–34 years old, and 32.9/100 000 in 45–49 years old [3].

Some researchers suggested that the risk factors for ischemic stroke included atrial fibrillation, dyslipidemia, smoking, meal, and physical activity [1–3,9,10] and in the young group, male patients were more than female patients [3,9].

Alcohol abuse is another risk factor for not only ischemic stroke but also hemorrhagic stroke and

migraine, which increase the risk of ischemic stroke almost threefolds [3].

Another researcher found the fact that hypertension, smoking, dyslipidemia, heart disease, metal stress, and DM type-2 were common risk factors for ischemic stroke, and importantly more than 50% of individuals who had past history of TIA would appear with ischemic stroke [4,6,7].Season is another risk factor for stroke; in particular, the incidence of ischemic stroke was higher in winter than in other season [7].

Stroke is a heterogeneous multifactorial disease. Studies conducted in twins, families, and animal models provide evidence for a genetic contribution to stroke, although the real effect of genetics is still unknown [5].

Through our research, we can know that there are more risk factors in the nonfamilial young ischemic stroke group than the familial group.

Moreover, the effect of each risk factor is different in both group, so if we take an appropriate measure according to the family history, it would be helpful in the prevention of ischemic stroke.

It is just a first step for us to study genetic association with ischemic stroke.

Conclusion

The incidence of ischemic stroke in young is different with family history. Young patients with ischemic stroke with a family history have less risk factors than without family history, and the effect of each risk factor is different between familial and nonfamilial groups.

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Conflicts of interest
There are no conflicts of interest.

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