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Original Article

Correlation between ideal cardiovascular health behavior and isolated diastolic hypertension

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Abstract: Objectives: The aim of this study was to examine the correlation between ideal cardiovascular health behaviors and isolated diastolic hypertension. Patients and methods: Patients were selected, from January 2016 to December 2016, from the Department of Cardiology of the Tangshan Gongren Hospital group (including 11 two-level hospitals and 20 community health service stations) in the Department of Cardiology (Internal Medicine). Patients conformed to the standards of admission, meeting the exclusion criteria of 1,760 cases. The final 28,995 cases were included in the study, including simple diastolic hypertension (DBP ≥ 90 mmHg, SBP < 140 mmHg). There were 4,269 cases in the group of patients with pressure (DBP ≥ 90 mmHg, SBP < 140 mmHg). 3,793 cases in males, 476 in females and 24,726 with normal blood pressure, 17,040 in males and 7,686 in females. The questionnaire was designed according to ideal cardiovascular health behavior standards defined by the American Heart Association. The questionnaire was completed by trained professional doctors and participants. Data was entered into the computer by two men. Cross sectional study methods were used to analyze the correlation between ideal cardiovascular health behaviors and isolated diastolic hypertension. SPSS17.0 software package was used to analyze data. Measurement data are expressed by mean standard deviation ($\bar{x} \pm s$). Independent sample *t*-test was used in the group. The number of cases (%) of count data (%) is expressed. Chi-squared test was used for comparisons between the groups. $P < 0.05$ (bilateral) indicates statistical significance. Results: (1) There were 4,269 cases of Isolated diastolic hypertension (3,793 males and 476 females). Average age was 41.87 ± 6.08 years. Average diastolic pressure was 92.92± 4.51 mmHg. The control group was 24,726 (17,040 men, 7,686 women). Average age was 39.74 ± 7.28 years and average diastolic pressure was 75.87 ± 7.11 mmHg. Differences between the simple diastolic hypertension group and control group were statistically significant, regarding sex, age, body mass index (BMI), smoking, exercise, healthy diet, systolic pressure (SBP), diastolic pressure (DBP), total cholesterol (TC), triglycerides (TG), low density lipoprotein cholesterol (LDL-C), fasting blood glucose (FBG), and alcohol consumption. Learning significance ($P < 0.05$); (2) Correction of sex, age, and multiple factor logistic regression analysis: risk factors for simple diastolic hypertension were age (year) and sex (male). Corresponding *OR* values (95% CI) were 4.41 (3.96-4.90) and 1.05 (1.04-1.06), respectively; Ideal cardiovascular health behavior: no smoking, healthy diet, BMI < 25 kg/m^2, and weekly physical activity were protective factors for simple diastolic hypertension. Corresponding *OR* values (95% CI) were 0.63 (0.58-0.68), 0.76 (0.67-0.86), 0.58 (0.58-0.60), and 0.76 (0.64-0.91) ($P < 0.05$); (3) Further correction of alcohol, TC, TG, LDL-C, and FBG: Multivariate logistic regression analysis showed that risk factors of simple diastolic hypertension were sex (male), age (year), TG, and FBG. Corresponding OR values (95% *CI*) were 4.38 (3.94-4.88), 1.04 (1.04-1.05), 1.13 (1.11-1.16), 1.16 (1.11-1.22), and 1.05 (1.03-1.08); Ideal cardiovascular health behaviors: non-smoking, healthy diet, BMI < 25 kg/m^2, and weekly physical activity were protective factors for simple diastolic hypertension. Corresponding *OR* values (95% CI) were 0.75 (0.68-0.82), 0.80 (0.70-0.90), 0.60 (0.59-0.62), and 0.80 (0.66-0.95). Alcohol consumption was a protective factor for simple diastolic hypertension. OR value (95% CI) was 0.66 (0.60-0.74) ($P < 0.05$). Conclusion: Ideal cardiovascular health behaviors are protective factors for isolated diastolic hypertension.

Keywords: Ideal cardiovascular health behaviors, isolated diastolic hypertension, cross-sectional study

Introduction

Isolated diastolic hypertension (IDH) is a subtype of hypertension, referring to diastolic pressure of more than 90 mmHg and systolic blood pressure less than 140 mmHg of hypertension [1, 2]. It has been concluded that IDH can develop into systolic hypertension [3] and systolic

diastolic hypertension. IDH is a risk factor of [4-7] cardiovascular and cerebrovascular diseases. It can increase the mortality of cardiovascular and cerebrovascular diseases [8]. However, IDH has not garnered enough attention. Clinical experience and high blood pressure research [9-11] have shown that various antihypertensive drugs to reduce the effects of IDH have not been satisfactory, resulting in low control rates of IDH.

The American Heart Association (AHA) proposed the definition of ideal cardiovascular health behaviors and factors in 2010 [12]. The following studies have shown that the number of ideal CVH behaviors and factors can reduce subclinical target organ damage [13-21], psycho-mental illness [22], cognitive dysfunction [23], cardio cerebral vascular events [24-26], and terminal stage nephropathy [27], but also reduces the risk of malignant tumors [28] and all-cause deaths [29, 30]. The aim of this study was to investigate whether ideal CVH behaviors have any protective effects on IDH, providing data support for IDH prevention and treatment.

Methods

Study design and population

From January 2016 to December 2016, patients in the Department of Cardiology of Tangshan Gongren Hospital group (including 11 two-level hospitals and 20 community health service stations) were hospitalized in the Department of Cardiology (Internal Medicine). A total of 28,995 cases were divided into the diastolic hypertension group (diastolic blood pressure equal or more than 90 mmHg, systolic blood pressure less than 140 mmHg) (3,793 cases, male 3793 cases, female 476 cases) and the normal blood pressure group (24,726 cases as the control group, 17,040 male cases and 7,686 female cases). The clinical trial was approved by the Ethics Committee of Tangshan Gongren Hospital and all patients agreed to participate in the study, providing informed consent.

General data assessment

According to ideal CVH behaviors defined by the AHA [12], the questionnaire was designed and filled-out via face-to-face questions and answers from unified training professionals. General demographic data included age, sex, occupation, education, family history, personal history (smoking history, drinking history, eating habits, physical exercise), and past disease history (hypertension, coronary heart disease, diabetes, dyslipidemia), body weight, height, and blood pressure).

Laboratory assessment

For all patients, 5 mL of anterior elbow vein blood was taken in the EDTA tube in a fasting state. After 3,000 min centrifugation for 10 minutes at room temperature, the upper serum was taken. Total cholesterol (TC), glycerin three fat (TG), low density lipoprotein cholesterol (LDL-C), and high-density lipoprotein cholesterol (HDL-C) levels were measured using the Au-2700 fully automatic analyzer (Japanese OLYMPUS company). Fasting blood glucose (FPG) was also measured.

Blood pressure measurement

Basic requirements for measurement (referring to *China Hypertension Prevention Guidelines 2010* [1].

Preparation before measurement: (1) Measurement of the environment and subjects: Appropriate space, suitable temperature (room temperature), and a quiet environment; Subjects before blood pressure test: 30 minutes of non-smoking, no drinking or coffee; Emptying bladder, sitting at rest for 10 minutes; Measurement of horizontal position, prohibition, measurement of left upper arm blood pressure, and elbow abduction 45 degrees.

Measurement of blood pressure tools: (1) Blood pressure meter: International standards (AAMI, SHS, ESH) were used to verify the qualified upper arm electronic sphygmomanometer (OMRON HEM-7200, Dalian); (2) Cuff: 12 cm × 26 cm. Cuff balloon in the middle of the upper arm of the upper arm of the brachial artery, the lower edge of the cuff should be in the elbow bend 2.5 cm; Tight, can be stuffed into 2 fingers as appropriate; (3) Quantity: Completed by professional nurses trained in blood pressure measurement.

Measurement attention: (1) The number of the end of the blood pressure value should be

accurate to 1 mmHg, that is, any integer between 0-9; (2) If differences in the 2 readings of the systolic or diastolic pressure are more than 5 mmHg, they should be measured again, taking the average record of the two readings.

Ideal cardiovascular health behaviors

Each ideal CVH behavior reference AHA standard [12] was divided into three state grades: ideal, general, and poor. (1) Smoking: Ideal: no smoking or smoking cessation for more than 12 months; General: once smoked, already quit for no more than 12 months. Poor: still smoking; (2) Body Mass Index (BMI) = weight (kg)/height $(m)^2$: Ideal: < 25 kg/m^2; General: 25.0-29.9 kg/m^2; Poor: ≥ 30 kg/m^2; (3) Physical exercise: Ideal: every week or more than 150 minutes of medium intensity physical exercise or weekly > 75 minutes of higher intensity physical exercise (including walking, riding, jogging, swimming, and doing housework); General: weekly 1-149 minute moderate intensity physical exercise or a weekly 1-74 minute high intensity physical exercise; Poor: no physical exercise; (4) Healthy diet: a total of 5 dietary standards. Ideal: in line with 4-5 items; General: 2-3 items; Poor: 0-1 item. Intake of sodium salt was less than 1500 mg/day; Intake of vegetables or fruits was more than 130 g/day; Intake of fish was more than 200 grams per week; Intake of sweet or sugary drinks was less than 450 Kcal/week; Grams of grain food (coarse grain) was more than 200 grams per day.

Statistical analyses

SPSS 17.0 software package was used to analyze present data. Measurement data are expressed as mean standard deviation ($\bar{x} \pm s$). Independent sample *t*-test was used to analyze data. The number of cases (%) of count data (%) is indicated by Chi-squared testing. Factors affecting IDH were analyzed using logistic regression analysis. $P < 0.05$ (bilateral) indicates statistical significance.

Results

The IDH group consisted of 4,269 cases (male 3793 cases, female 476 cases), with an average age of 41.87 ± 6.08 years and average diastolic pressure of 92.91 ± 4.51 mmHg. The control group included 24,726 cases (17,040 male cases, 7,686 female cases), with an average age of 39.74 ± 7.28 years and average diastolic pressure of 75.87 ± 7.11 mmHg. The IDH group and control group were significantly different in sex, age, BMI, smoking, physical exercise, healthy diet, SBP, DBP, total cholesterol (TC), triglycerides (TG), low density lipoprotein cholesterol (LDL), fasting blood glucose (FBG), and drinking history. Differences were statistically significant ($P < 0.05$) (see **Table 1**).

Correction of sex and age, according to multiple factor logistic regression analysis, showed that risk factors of IDH were age (year) and sex (male). Corresponding *OR* values (95% *CI*) were 4.406 (3.96-4.90) and 1.05 (1.04-1.05), respectively. Ideal CVH behaviors include no smoking, a healthy diet, BMI < 25 kg/m^2, and physical exercise every week, as protective factors for IDH. Corresponding *OR* values (95% *CI*) were 0.63 (0.58-0.68), 0.76 (0.67-0.86), 0.58 (0.59-0.60), and 0.76 (0.64-0.91) ($P < 0.05$) (see **Table 2**).

Further correction of drinking, TC, TG, LDL, and FBG, according to multivariate logistic regression analysis, showed that risk factors of IDH were sex (male), age (years), TG, LDL, and FBG. Corresponding *OR* values (95% *CI*) were 4.38 (3.96-4.88), 1.04 (1.04-1.05), 1.13 (1.11-1.16), 1.16 (1.11-1.22), and 1.05 (1.03-1.08). Ideal CVH behaviors include no smoking, a healthy diet, BMI < 25 kg/m^2, and weekly physical exercise, as protective factors of IDH. Corresponding *OR* values (95% *CI*) were 0.75 (0.68-0.82), 0.80 (0.70-0.90), 0.60 (0.59-0.62), and 0.80 (0.66-0.95), respectively. Alcohol consumption was a protective factor for IDH. Its *OR* (95% *CI*) was 0.66 (0.60-0.74) ($P < 0.05$) (see **Table 3**).

Discussion

The current study concluded that IDH mainly occurs in young and middle-aged people, with an average age of 41.87 ± 6.08 years. Patients are mainly males (accounting for 88.85%). Ideal CVH behaviors include no smoking, a healthy diet, BMI < 25 kg/m^2, and weekly physical exercise, as protective factors of IDH. Corresponding *OR* values (95% *CI*) were 0.75 (0.68-0.82), 0.80 (0.70-0.90), 0.60 (0.59-0.62), and 0.80 (0.66-0.95). Alcohol consumption is a protective factor of IDH. Its *OR* value (95%) was 0.66 (0.60-0.738) ($P < 0.05$). Cardiovascular CVH is a protective factor for IDH.

Table 1. Comparison of basic clinical data of the whole population, IDH group, and control group

	Total	IDH	Control group	t/x^2	p
Age (ys)	40.05 ± 7.16	41.87 ± 6.08	39.74 ± 7.28	-18.07	< 0.001
SBP (mmHg)	117.82 ± 12.37	132.12 ± 7.43	115.36 ± 11.33	-93.24	< 0.001
DBP (mmHg)	78.38 ± 9.09	92.91 ± 4.51	75.87 ± 7.11	-151.33	< 0.001
BMI (kg/m^2)	24.51 ± 3.536	26.04 ± 3.52	24.25 ± 3.47	-31.07	< 0.001
TC (mmol/L)	1.57 ± 1.36	2.03 ± 1.64	1.49 ± 1.29	-23.89	< 0.001
TG (mmol/L)	4.78 ± 1.10	4.91 ± 1.27	4.75 ± 1.06	-8.65	< 0.001
LDL (mmol/L)	2.34 ± 0.77	2.15 ± 0.79	2.33 ± 0.76	-7.001	< 0.001
FBG (mmol/L)	5.22 ± 1.26	5.44 ± 1.63	5.18 ± 1.18	-12.46	< 0.001
Male	20833 (71.85)	3793 (88.85)	17040 (68.915)	715.27	< 0.001
Smoking				17.07	< 0.001
Ideal	8875 (30.61)	1309 (30.66)	7566 (30.60)		
Intermediate	2409 (8.31)	287 (6.72)	2122 (8.58)		
Poor	17711 (61.08)	2673 (62.61)	15038 (60.82)		
Healthy diet				68.63	< 0.001
Ideal	2927 (10.10)	344 (8.06)	2583 (10.466)		
Intermediate	23197 (0.80)	3375 (79.06)	19822 (80.17)		
Poor	2871 (0.10)	550 (12.88)	2321 (9.39)		
Physical exercise				30.28	< 0.001
Ideal	1993 (6.87)	213 (4.99)	1780 (7.20)		
Intermediate	23787 (82.04)	3603 (84.40)	20184 (81.63)		
Poor	3215 (11.09)	453 (1.06)	2762 (11.17)		
BMI				743.33	< 0.001
Ideal	16835 (58.06)	1729 (40.50)	15106 (61.09)		
Intermediate	10261 (35.39)	1995 (46.73)	8266 (33.43)		
Poor	1899 (6.55)	545 (12.77)	1354 (5.48)		
Alcohol				166.43	< 0.001
Never	16097 (55.54)	2589 (60.68)	13508 (54.65)		
Former	8843 (30.51)	953 (22.33)	7890 (31.92)		
Often	4045 (13.96)	725 (16.99)	3320 (13.43)		

Note: SBP: systolic blood pressure; DBP: diastolic blood pressure; TC: total cholesterol; TG: triglyceride; LDL: low density lipoprotein cholesterol; FBG: fasting blood glucose.

IDH is found mostly in the early stages of hypertension. Nearly half can gradually develop into ISH and SDH. Most cases are in young people. Most are ignored because of no symptoms. Some patients have atypical symptoms, including chest tightness, shortness of breath, head discomfort, and mental malaise. In recent years, the harmful nature of IDH has been recognized. A domestic study [5] examined 26,587 cases of patients with no stroke history and over 35 years old, for 10 years. Risk of stroke in group ISH was slightly higher than that of group IDH, but there were no statistical differences between the two. This suggests that IDH and ISH are quiet in prediction of strokes. The Franklin SS [4] study of 5,968 people over 18 years old found that the risk of metabolic syndrome in IDH (14.7) patients was higher than that of ISH (10.2) and SDH (12.2) ($P < 0.01$) patients with hypertension and metabolic syndrome. Risk of metabolic syndrome was almost 15 times as high as those of with ideal blood pressure. Nishizaka [7] and other studies have shown that IDH is a better predictor of coronary heart disease for people under 50 years of age. A prospective study by Li H [31] divided blood pressure into normal blood pressure, prehypertension, ISH, IDH, and SDH groups, according to baseline blood pressure. Cox's proportional risk model was used to analyze the relationship between hypertension subtypes and cardiovascular events in the normal blood pressure group. After adjusting for sex and age, risk ratios of cardiovascular events (95% *CI*) were

Table 2. Multiple factor Logistic regression analysis affecting IDH

	B	*SE*	*WALD*	*P*	*OR (95% CI)*
Sex	1.48	0.05	752.18	< 0.001	4.41 (3.96-4.90)
Age (ys)	0.05	0.01	332.3	< 0.001	1.05 (1.04-1.05)
Smoking					
Poor					1.00 (Reference)
Intermediate	-0.20	0.07	8.16	< 0.001	0.82 (0.71-0.94)
Ideal	-0.46	0.04	130.22	< 0.001	0.63 (0.58-0.68)
Healthy diet					
Poor					1.00 (Reference)
Intermediate	0.05	0.09	0.35	0.55	0.95 (0.80-1.13)
Ideal	-0.27	0.06	18.44	< 0.001	0.76 (0.67-0.86)
BMI					
Poor					1.00 (Reference)
Intermediate	-0.63	0.06	115.34	< 0.001	0.67 (0.66-0.71)
Ideal	-1.21	0.06	423.50	< 0.001	0.58 (0.59-0.60)
Physical exercise					
Poor					1.00 (Reference)
Intermediate	0.07	0.06	1.52	0.22	1.07 (0.96-1.20)
Ideal	-0.27	0.09	8.82	< 0.001	0.76 (0.64-0.91)

1.75 (0.92-3.33), 2.11 (0.95-4.70), 2.14 (1.01-4.56), and 5.31 (2.86-9.77). After further adjustments of other cardiovascular risk factors, risk ratios were (95% *CI*) 1.74 (0.92-3.31), 2.00 (0.88-4.54), 2.20 (1.02-4.74), and 4.92 (2.62-9.26). The study concluded that both IDH and SDH were significantly associated with risk of cardiovascular disease. Guichard JL [32] and other studies have shown that IDH is an important independent risk factor for heart failure. At present, however, no diastolic blood pressure drugs have been effective. Clinical experience and big data hypertension research, including HOT [9], ALLHAT [10], and CONVINCE [11], have shown that all kinds of antihypertensive drugs have poor effects on IDH.

Effective control of IDH should be based on its pathophysiological and epidemiological characteristics. One study [33] showed obvious epidemiological differences between ISH and IDH. Young and middle-aged people are the good hair population of IDH [34], mainly because the arterial compliance of middle-aged and young people is still good. Thus, the retracting of large arteries in the diastolic phase is powerful. However, resistance of the peripheral blood vessels is increased, resulting in the increase of the resistance of peripheral blood vessels. In young and middle-aged hypertension, IDH is mainly caused by increased diastolic blood pressure and smaller pulse pressure.

Other epidemiological characteristics of IDH include BMI, smoking, high salt diet, and lack of physical exercise. Franklin SS [4] studied 3,915 individuals of normal blood pressure in the Framingham study population for 10 years. Results showed that, in young people, especially men, the increase of DBP was closely related to high baseline BMI, as well as an increase of BMI during the follow-up period. Those with bad habits, such as smoking, drinking, and lack of physical exercise, are high-risk patients of IDH. IDH patients are more likely to be accompanied by smoking, drinking, and a high-salt diet than those of the same age group [35]. However, results of this study sh=owed that drinking was a protective factor for IDH. Another study [36] showed that drinking increased the prevalence of hypertension in men, while the impact on women was the J curve. A proactive cohort study of the Kailuan population [37] was carried out, examining the relationship between BMI and hypertension in the 18-30 year-old population. Moreover, 4,765 people were followed-up for 5.8 years. Results showed that 999 cases of hypertension occurred during the period, including 14% of ISH, 62% in IDH, and 24% in DSH. In the low BMI group, normal BMI group, super recombination, and obese group, cumulative hypertension incidence rates, respectively, were 9.9%, 18.28%, 34.97%, and 61.3%. Among 18-30 year old people, incidence of hypertension is mainly IDH. With an increase of BMI, incidence and risks of hypertension are increased. The effects of obesity on incidence of IDH and SDH in young people are greater. One study [38] showed that occurrence of IDH was related to dietary structure, including type of drinking water, edible oil, and frequency of food products, fruits, vegetables, and milk products. Thus, food composition may lead to occurrence of IDH through obesity.

In recent years, the prevalence of hypertension has increased year by year and is trended younger. In 2002, it was reported that the prevalence rate of hypertension in 35-44 years old was more than 60% [39]. IDH accounted for 36.9% in hypertensive patients less 55 years

Table 3. Multiple factor Logistic regression analysis of IDH

	B	*SE*	*WALD*	*P*	*OR (95% CI)*
Sex	1.48	0.06	721.35	< 0.001	4.38 (3.94-4.88)
Age (ys)	0.04	0.01	209.68	< 0.001	1.04 (1.04-1.05)
Smoking					
Poor					1.00 (Reference)
Intermediate	0.09	0.07	1.64	0.20	1.10 (0.95-1.27)
Ideal	-0.29	0.05	36.54	< 0.001	0.75 (0.68-0.82)
Healthy diet					
Poor					1.00 (Reference)
Intermediate	0.36	0.09	0.17	0.68	1.04 (0.87-1.24)
Ideal	-0.23	0.06	12.63	< 0.001	0.80 (0.70-0.90)
BMI					
Poor					1.00 (Reference)
Intermediate	-0.58	0.06	94.74	< 0.001	0.694 (0.666-0.729)
Ideal	-1.10	0.06	330.55	< 0.001	0.60 (0.59-0.62)
Physical exercise					
Poor					1.00 (Reference)
Intermediate	0.07	0.06	1.45	0.23	1.07 (0.96-1.20)
Ideal	-0.23	0.09	6.15	0.01	0.8 (0.66-0.95)
Alcohol					
Never					1.00 (Reference)
Former	-0.72	0.15	23.09	< 0.001	0.49 (0.36-0.65)
Often	-0.43	0.06	86.35	< 0.001	0.66 (0.60-0.74)
TC	0.00	0.02	0.00	0.97	0.10 (0.97-1.03)
TG	0.12	0.01	124.71	< 0.001	1.13 (1.11-1.16)
LDL	0.15	0.02	37.45	< 0.001	1.16 (1.11-1.22)
FBG	0.05	0.01	17.48	< 0.001	1.05 (1.03-1.08)

Note: TC: total cholesterol; TG: triglyceride; LDL: low density lipoprotein cholesterol; FBG: fasting blood glucose.

old [40]. Incidence of obesity in young people in China has significantly increased. Incidence of overweight and obesity in 2010 was 8.7 times and 38.1 times [41] that in 1985, respectively.

In summary, the current study concludes that IDH is a significant risk factor for cardiovascular and cerebrovascular diseases and is a lifestyle disease. It can be prevented and controlled, however. Antihypertensive drugs and behavioral factors should be combined, not simply relying on antihypertensive drugs [38]. This study, combined with ideal CVH behaviors proposed by the AHA, analyzed the epidemiological characteristics of IDH. Results suggest that ideal cardiovascular health behavior is a protective factor for occurrence of IDH. Appropriate behavior can help prevent and control the development of IDH.

Results of the current study are consistent with previous studies [42], indicating that exercise, healthy diet, weight control, balance mental stress, and smoking cessation can help control IDH. A previous study showed that a healthy lifestyle change could reduce plasma concentrations of vasoactive substances in IDH patients, such as the medulla of the adrenal gland (ADM), prostacyclin (PGI2), angiotensin II (AT2), and thromboxane A2 (TXA2). Mechanisms: The American scholar Laragh [43] analyzed the pathogenesis of hypertension. “R” type hypertension is more IDH, characterized by many young people with high blood pressure, mostly accompanied by increased sympathetic nervous tension and (or) activation of the renin angiotensin aldosterone (RAAS) system. Lifestyle changes reduce plasma vasoactive substances in IDH patients, thereby blocking increases in the sympathetic nervous system and activation of the RAAS system.

There were several advantages of the current study. The population of the study was a cross-section of the whole population of the community, without any intervention to the population. For the natural state of the population, the relationship between ideal CVH behavior and IDH can be better displayed. The study, based on the definition of the behavior and factors of AHA, can better quantify the content of healthy behavior and help to promote it. In IDH patients that achieve the goal of cooperative hypotension, IDH is well-controlled. The population size of the study was large and the data obtained are of scientific value.

There were several shortcomings of the present study. It was a single-center study, which may have affected results. Multi-center research is necessary in the future. Smoking, diet, and physical exercise content was received mostly from the patients. Therefore, the degree of quantification may be biased.

In general, results suggest that careful monitoring and active treatment of IDH, along with efforts to achieve ideal CVH behavior, are important strategies in controlling blood pressure and preventing cardiovascular disease.

Disclosure of conflict of interest

None.

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