Journal of Clinical and Nursing Research, 2025, Volume 9, Issue 4
http://ojs.bbwpublisher.com/index.php/JCNR
Online ISSN: 2208-3693
Print ISSN: 2208-3685

Correlation of Serum 25-hydroxyvitamin D Levels with Senile Hypertension and Its Stroke

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Abstract: *Objective:* Correlation of serum 25-hydroxyvitamin D level with senile hypertension and its stroke. *Methods:* Two hundred hypertensive patients admitted to the hospital from February 2022 to December 2023 were classified as study subjects. They were divided into grade 2 hypertension group and grade 3 hypertension group, and 100 healthy medical checkups admitted during the same period were analyzed as study subjects. *Results*: Comparison of diagnostic results between grade 2 hypertension and grade 2 hypertensive stroke patients, there was a difference in 25(OH)D, ($P < 0.05$). Comparison of test results between grade 3 hypertension and grade 3 hypertensive stroke patients, there was a difference in age, BMI, 25(OH)D, GLU, LDL-C, ($P < 0.05$). Serum 25-hydroxyvitamin D level is a high-risk factor for the occurrence of stroke in elderly hypertensive patients, so the probability of risk is higher, where 25(OH)D (ng/mL), GLU (mmol/L), there is a difference, ($P < 0.05$). *Conclusion:* There is a greater relationship between the occurrence of stroke and serum 25-hydroxyvitamin D level in elderly hypertensive patients. The occurrence of the disease has a greater relationship with this indicator in patients and is also a high-risk factor that affects the patients' morbidity, so it is necessary to pay attention to the monitoring of this indicator after the onset of the disease in patients.

Keywords: Serum 25-hydroxyvitamin D level; Geriatric hypertension; Stroke; Correlation

Online publication: April 29, 2025

1. Introduction

Hypertension, as an important disease influenced by a combination of environmental and genetic constraints, has received much attention in recent years. Among them, the incidence of cardiovascular disease in the elderly in China is increasing year by year. Hypertension or stroke will lead to the patient's organ structure and function

being affected and may eventually occur as organ failure. At the same time, hypertensive patients are easily combined with cerebrovascular disease after the onset of the disease, although the difference in the overall prevalence of patients is less than. Among them, the incidence of women among elderly patients is higher [1]. The occurrence of stroke in hypertensive patients has a greater relationship with the serum 25-hydroxyvitamin D level of patients. In the clinical analysis, doctors can use serum 25-hydroxyvitamin D level to analyze the prognostic value of the patients, to explore the seasonal factors of the patients suffered from the impact of in-depth research. Choosing 200 cases of hypertension patients admitted into the hospital from February 2022 to December 2023 as research subjects, divided into grade 2 hypertension group and grade 3 hypertension group, and 100 cases of healthy medical checkups admitted by ventilation as research subjects, the patients' data and report are analyzed.

2. Information and methodology

2.1. General information

The 200 hypertensive patients admitted to the hospital from February 2022 to December 2023 were divided into the study population, which was divided into the group of grade 2 hypertension and grade 3 hypertension, and the 100 health check-ups admitted by ventilation were the study population, and the patient data were analyzed.

2.2. Inclusion criteria

(1) Consent to participate in the study
(2) Complete pathological data
(3) Normal cognitive function.

2.3. Exclusion criteria

(1) Natural loss of visitation
(2) Infectious diseases
(3) Cognitive impairment
(4) Liver and kidney impairment
(5) Blood disorders

2.4. Methodology

2.4.1. Blood pressure monitoring

Hospitalized patients are monitored using a blood pressure monitor, and the nursing staff helps the patient with the test, which requires ten minutes of rest before the test. The patient's arm should be at the same height as the heart and the femoral artery blood pressure should be measured three times at one-minute intervals [2].

2.4.2. Biochemical tests

The obtained blood pressure samples were sorted for serum > 1 ml and stored in freezer tubes at a temperature of 20°. Triacylglycerol (TG), total cholesterol (TC), high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C), and fasting glucose (GLU) indices were monitored [3].

2.4.3. Serum 25-hydroxyvitamin D test methods

Serum 25-hydroxyvitamin D was monitored using a fully automated blood test, and serum 25-hydroxyvitamin D was examined using an immuno emulsion turbidimetric method [4].

2.5. Observation indicators and assessment criteria

(1) Analysis of the basic data and biochemical indexes of the three groups of patients

(2) Compare the diagnostic results of grade 2 hypertension with grade 2 hypertensive stroke patients

(3) Comparison of test results between grade 3 hypertension and grade 3 hypertensive stroke patients

(4) Serum 25-hydroxyvitamin D levels and regression of hypertensive stroke in the elderly

2.6. Statistical treatment

The study used SPSS 25.0 statistical software to analyze all the data where ($\bar{x} \pm s$) was tested using t-tool to compare the data differences. And data expressed in (%) were tested using χ^2 tool. Data less than 0.05 were significantly different.

3. Results

3.1. Analysis of basic data and biochemical indexes of the three groups of patients

The basic data and biochemical indicators of the three groups of patients are shown in **Table 1**.

Table 1. Comparison of basic data and biochemical indices of the three groups of patients ($\bar{x} \pm s$)

Sports event	Grade 2 hypertension group (*n*=100)	Grade 3 hypertension group (*n*=100)	Control group (*n*=100)
Age (years)	69.54 ± 6.32	68.54 ± 6.32	66.32 ± 6.35
BMI (kg/m^2)	24.31 ± 3.62	24.32 ± 3.42	22.31 ± 3.13
Pulse pressure difference (mmHg)	64.57 ± 12.32	72.31 ± 19.45	52.32 ± 12.32
25(OH)D (ng/mL)	17.63 ± 5.24	16.32 ± 7.25	21.12 ± 6.65
GLU (mmol/L)	5.13 ± 0.67	5.36 ± 0.89	5.32 ± 0.42
TC (mmol/L)	4.26 ± 0.56	4.64 ± 1.06	5.34 ± 1.15
TG (mmol/L)	1.64 ± 1.13	1.87 ± 1.32	1.35 ± 0.97
HDL-C (mmol/L)	1.27 ± 0.34	1.14 ± 0.34	1.54 ± 0.36
LDL-C (mmol/L)	2.63 ± 0.78	3.85 ± 0.97	3.68 ± 1.05

3.2. Comparison of diagnostic findings in stroke patients with grade 2 hypertension versus grade 2 hypertension

There was a difference in 25(OH)D between the diagnostic results of grade 2 hypertension compared to grade 2 hypertensive stroke patients, ($P < 0.05$). See **Table 2**.

Table 2. Comparison of diagnostic outcomes in patients with grade 2 hypertension and grade 2 hypertensive stroke ($\bar{x} \pm s$)

Sports event	Grade 2 hypertension group (*n*=62)	Grade 2 hypertensive stroke group (*n*=38)	*t*	*P*
Age (years)	69.45 ± 5.96	69.65 ± 6.35	0.212	0.913
BMI (kg/m^2)	24.12 ± 4.25	23.64 ± 2.45	1.245	0.212
Pulse pressure difference (mmHg)	63.12 ± 12.35	65.32 ± 14.12	0.532	0.675
25(OH)D (ng/mL)	19.57 ± 4.75	14.45 ± 5.32	10.212	0.001
GLU (mmol/L)	4.85 ± 0.75	5.23 ± 0.45	0.981	0.115
TC (mmol/L)	4.53 ± 0.85	4.24 ± 0.94	0.975	0.164
TG (mmol/L)	1.67 ± 1.32	1.56 ± 0.52	0.401	0.854
HDL-C (mmol/L)	1.25 ± 0.31	1.16 ± 0.31	0.584	0.612
LDL-C (mmol/L)	2.78±0.78	2.43 ± 0.75	0.934	0.169

3.3. Comparison of test results in stroke patients with grade 3 hypertension vs. grade 3 hypertensive stroke patients

Comparison of test results between grade 3 hypertension and grade 3 hypertensive stroke patients showed differences in age (years), BMI (kg/m^2), 25(OH)D (ng/mL), GLU (mmol/L), and LDL-C (mmol/L), ($P < 0.05$). The details are shown in **Table 3**.

Table 3. Test results comparing grade 3 hypertension with grade 3 hypertensive stroke patients ($\bar{x} \pm s$)

Sports event	Grade 2 hypertension group (*n*=75)	Grade 2 hypertensive stroke group (*n*=25)	*T*-value	*P*-value
Age (years)	67.54 ± 6.32	69.65 ± 6.32	8.645	0.003
BMI (kg/m^2)	24.31 ± 3.12	23.21 ± 2.32	10.326	0.001
Pulse pressure difference (mmHg)	72.32 ± 20.31	73.52 ± 17.52	0.432	0.785
25(OH)D (ng/mL)	17.64 ± 7.63	14.52 ± 6.32	9.235	0.002
GLU (mmol/L)	5.13 ± 0.52	5.32 ± 1.24	10.645	0.001
TC (mmol/L)	4.78 ± 0.94	4.45 ±1.16	0.437	0.784
TG (mmol/L)	2.13 ± 1.25	1.45 ± 0.52	0.975	0.102
HDL-C (mmol/L)	1.12 ± 0.24	1.25 ± 0.45	0.758	0.463
LDL-C (mmol/L)	2.98 ± 0.85	2.65 ±1.02	7.409	0.006

3.4. Regression analysis of serum 25-hydroxyvitamin D levels and hypertensive stroke in the elderly

Serum 25-hydroxyvitamin D level is a high-risk factor for stroke in elderly hypertensive patients, so the probability of risk is higher, where 25(OH)D (ng/mL) and GLU (mmol/L), there is a difference, ($P < 0.05$), as shown in **Table 4**.

Table 4. Serum 25-hydroxyvitamin D levels and regression of hypertensive stroke in the elderly [n (%)]

Variant	Statistic	*P*-value	OR value
Age (years)	0.005	0.841	0.945–1.026
BMI (kg/m^2)	0.124	0.352	0.852–1.564
Height (cm)	0.235	0.241	0.532–1.187
Weight (kg)	0.421	0.425	0.545–4.258
Systolic blood pressure (mmHg)	0.022	0.038	0.965–0.944
Diastolic blood pressure (mmHg)	0.008	0.467	0.984–1.034
25(OH)D (ng/mL)	0.097	0.001	0.841–0.061
GLU (mmol/L)	0.903	0.001	1.421–4.135
TC (mmol/L)	0.201	0.612	0.351–1.845
TG (mmol/L)	0.356	0.185	0.475–1.156
HDL-C (mmol/L)	0.341	0.485	0.264–1.947
LDL-C (mmol/L)	0.251	0.574	0.304–1.854
constant	17.321	0.476	

4. Discussion

Vitamin D acts as a form of hormone that regulates calcium and phosphorus metabolism in the body, and it can undergo a series of transformations as a result of sun exposure. Among them, serum 25-hydroxy levels are seasonally altered, with significantly higher levels in summer and significantly lower levels in winter and spring, and with the changes in hormone levels, the body also experiences a variety of diseases [5, 6]. The results were analyzed, and there was a difference in 25(OH)D between the diagnostic results of patients with grade 2 hypertension compared with those with grade 2 hypertensive stroke. There was a difference in age (years), BMI (kg/m^2), 25(OH)D (ng/mL), GLU (mmol/L), and LDL-C (mmol/L) in the comparison of the test results of patients with grade 3 hypertension compared with those with grade 3 hypertensive stroke.

Serum 25-hydroxyvitamin D level is a high-risk factor for stroke in elderly hypertensive patients, and therefore, the probability of risk is higher, with differences in 25(OH)D (ng/mL), GLU (mmol/L) [7]. Vitamin D varies with changes in serum 25-hydroxy levels, especially for cardiovascular disease, and there is the potential for a variety of conditions. The more severe the patient's hypertension, the lower the patient's serum 25-hydroxy and the greater the impact on the patient. Although it does not lead to the patient's morbidity, it is a risk factor for the patient's morbidity.

Vitamin D is a key predictor of stroke and is an independent factor in patient morbidity [8]. The occurrence of stroke in elderly hypertensive patients is affected by a variety of factors. Serum 25-hydroxyvitamin D level has a greater relationship with the patient, and from the results of clinical research and the results of a number of foreign studies, this indicator is the most important factor in determining the onset of the patient's disease. The patient's situation can be judged through this way, and in the clinic to strengthen the management of the patient, control the changes in this indicator [9, 10].

5. Conclusion

In summary, the occurrence of stroke in elderly hypertensive patients has a greater relationship with serum 25-hydroxyvitamin D levels, and the occurrence of the disease has a greater relationship with this indicator in patients. It is also a high-risk factor that affects the morbidity of the patients, so it is necessary to pay attention to the monitoring of this indicator after the onset of the disease in the patients.

Funding

Analysis of a Clinical Study of Vitamin D Supplementation in Improving the Prognosis of H-type Hypertension in the Elderly (Project No.: 2341ZF140)

Disclosure statement

The authors declare no conflict of interest.

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