Journal of Clinical and Nursing Research, 2022, Volume 6, Issue 2
http://ojs.bbwpublisher.com/index.php/JCNR
ISSN Online: 2208-3693
ISSN Print: 2208-3685

# Analysis on Risk Factors of Cervical Vertigo

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**Abstract:** *Objective:* Through the real-world electronic medical record information system, the medical records of patients with cervical vertigo were sorted and statistically analyzed to explore the risk factors of patients with cervical vertigo. *Method:* Retrospective case-control study was adopted. The general status and accompanying symptoms, medical history, auxiliary examination and other medical records of the patients were subject to statistical analysis, and risk factors were determined from logistic regression analysis. *Results:* The results of imaging examination showed that the risk of vertigo in patients with abnormal cervical physiological curvature was 2.607 times higher than that in patients with normal cervical physiological curvature, and the risk of vertigo in patients with narrowed intervertebral space was 0.431 times higher than that in patients with normal intervertebral space. *Conclusion:* There were differences in gender, cervical physiological curvature, intervertebral space and other clinical indexes between patients with cervical vertigo and patients without cervical vertigo. Abnormal cervical physiological curvature and narrowing of intervertebral space were significantly correlated with vertigo.

**Keywords:** Real world research; Cervical vertigo; Risk factor; Logistic regression

***Online publication:*** January 20, 2022

## 1. Introduction

Cervical vertigo (CV) is a syndrome mainly characterized by vertigo, head and shoulder pain, audio-visual sensory involvement, palpitation and sweating sympathetic symptoms. It was coined by Barre and Lieou in 1926; therefore, it is also known as Barre-Lieou syndrome [1]. With the gradual advancement of modernization, the acceleration of the pace of life and the universal application of electronic equipment, the incidence of cervical vertigo tends to increase in the younger populations, and the symptoms of vertigo are difficult to eradicate. Repeated hospitalization not only affects normal work and life, but also increases the medical burden of patients. This study intends to explore the risk factors of cervical vertigo patients through data mining, sorting and analysis of the medical records of cervical vertigo patients through the real-world electronic medical record information system, so as to provide evidence-based medical evidence for studying the pathogenesis of cervical vertigo and standardizing the diagnosis and prevention of cervical vertigo.

## 2. Research subjects

### 2.1. Source of cases

From October 2019 to October 2020, hospitalized patients in the geriatrics department (specialized disease

of vertigo), orthopedics department and acupuncture department of Shaanxi Traditional Chinese Medicine Hospital were selected. This study has been approved by the ethics committee of Shaanxi Traditional Chinese Medicine Hospital [approval no.: No. 43 Ethical Review (2019)].

### 2.2. Diagnostic criteria

Diagnostic criteria for CV in Expert Consensus on Vertigo Diagnosis and Treatment [2] issued by Neurology Branch of Chinese Medical Association in 2010: states that at present, there is no unified standard for diagnosing CV; therefore, exclusion method is preferred. CV is generally considered if the following features are manifested: (i) dizziness or vertigo is accompanied with neck pain; (ii) dizziness or vertigo appears after an increase of neck activity; (iii) cervical torsion test was positive in some patients; (iv) cervical imaging examination is abnormal, such as change of cervical curvature, vertebral instability, intervertebral disc herniation, etc.; and (v) most of them had a history of neck trauma. Vertigo caused by other causes are excluded.

### 2.3. Inclusion criteria

The research subjects were divided into two groups, namely case group and control group; the subjects in the former met the above-mentioned criteria, while those in the latter had abnormal imaging examination of the neck but with no discomfort such as vertigo, dazed or dizziness.

### 2.4. Exclusion criteria

The following individuals were excluded from the study: (i) patients who suffered from mental illness, and were unable to express subjective discomfort symptoms or with unclear consciousness; (ii) patients with serious primary diseases such as heart, brain, liver, kidney and hematopoietic system; and (iii) pregnant or lactating women.

## 3. Research content

### 3.1. Collection of information

The following information were gathered: (i) basic information such as age, gender and occupational category; (ii) condition data such as accompanying symptoms, trauma history, operation history and possible related medical history; and (iii) imaging examination of the neck.

### 3.2. Grouping

According to the inclusion and exclusion criteria, the electronic medical record information system was used to screen the medical record data meeting the criteria month by month, and finally the following results were obtained: there were 182 cases in the case group (cervical vertigo) and 127 cases in the control group (cervical spondylosis without vertigo).

## 4. Statistical analysis

SPSS 24.0 statistical software was used to establish data in the software system to be established using the double input method, and the input results were logically checked. The measurement data of normal distribution are expressed as mean ± standard deviation. Data that do not conform to normal distribution are expressed as $P_{50}$ ($P_{25}$, $P_{75}$), and the count data are expressed as rate (%). Two independent sample *t*-test were used for the analysis of normally distributed measurement data, and Mann-Whitney *U*-test was used for non-normal data. Fisher exact probability method or Chi-square test were used for analyzing count data. $P < 0.05$ means that the difference was statistically significant. For the factors with statistically significant differences between groups, binary logistic regression analysis was used. If $P < 0.05$, the difference was

statistically significant.

## 5. Results

### 5.1. Analysis of demographic data and condition data

The age data of the two groups was tested by normal distribution. The data of both groups conformed to normal distribution. The control group was 55.882 ± 11.916 years old and the case group was 55.039 ± 12.077 years old. The independent sample *t*-test was P = 0.544 (P > 0.05), which shows that the age difference between the two groups was not statistically significant.

There were significant differences in sex composition ratio, neck symptoms, upper limb symptoms and sympathetic symptoms between the case group and the control group. There was no significant difference between the two groups in occupational category, headache symptoms, sleep, diet, neck trauma and operation history, osteoporosis, thyroid disease, lacunar cerebral infarction disease history and so on. These can be seen in **Table 1**, **Table 2** and **Table 3**.

**Table 1.** Comparison of gender and occupational categories between the two groups

| Group | Gender | | Occupational category | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Male | Female | Retired | Others | Farmer | Business | Administration | Clerk | Worker | Technician |
| Control group | 44 (34.65%) | 83 (65.35%) | 61 (48.00%) | 23 (18.10%) | 4 (3.10%) | 1 (0.80%) | 10 (7.90%) | 9 (7.10%) | 6 (4.70%) | 13 (10.20%) |
| Case group | 42 (23.08%) | 140 (76.92%) | 97 (53.30%) | 21 (11.50%) | 2 (1.10%) | 3 (1.60%) | 19 (10.40%) | 8 (4.40%) | 8 (4.40%) | 24 (13.20%) |
| P | 0.026 * | | | | | | 0.46 | | | |

Note: *P < 0.05 shows that there was significant difference between the groups

**Table 2.** Comparison of disease data between the two groups

| Group | Neck symptoms | Upper limb symptoms | Headache | Sympathetic symptoms | Abnormal sleep | Abnormal diet |
|---|---|---|---|---|---|---|
| Control group | 125 (98.40%) | 71 (55.90%) | 7 (5.50%) | 8 (6.30%) | 37 (29.10%) | 5 (3.90%) |
| Case group | 137 (75.30%) | 62 (34.10%) | 14 (7.70%) | 52 (28.60%) | 65 (35.70%) | 19 (10.40%) |
| P | 0.001* | 0.001* | 0.454 | 0.001* | 0.226 | 0.057 |

Note: *P < 0.05 shows that there was significant difference between the groups

**Table 3.** Comparison of medical history between the two groups

| | Neck trauma surgery | Osteoporosis | Thyroid | Cerebral infarction |
|---|---|---|---|---|
| Control group | 5 (3.90%) | 7 (5.50%) | 8 (6.30%) | 10 (7.90%) |
| Case group | 4 (2.20%) | 3 (1.60%) | 12 (6.60%) | 20 (11.00%) |
| P | 0.582 | 0.118 | 0.918 | 0.363 |

### 5.2. Imaging examination of cervical spine

Cervical imaging examination includes DR, CT, MRI and other auxiliary examination methods of cervical spine or cervical intervertebral disc. The examination prioritized the use of DR results, supplemented by CT and MRI findings.

There were significant differences in cervical physiological curvature and intervertebral space narrowing between the two groups. The proportion of patients with abnormal physiological curvature in the case group was higher than that in the control group, and the proportion of patients with intervertebral space narrowing in the control group was higher than that in the case group. There was no significant difference between the two groups in vertebral marginal hyperosteogeny, intervertebral disc herniation, uncinate joint space stenosis, uncinate joint hyperosteogeny, nuchal ligament calcification and anterior longitudinal ligament calcification. This can be seen in **Table 4**.

**Table 4.** Comparison of neck imaging data between the two groups

| | Physiological curvature of cervical spine | | Narrowing of intervertebral space | Vertebral marginal Hyper-osteogeny | Intervertebral disc | | Uncovertebral joint | | Nuchal ligament calcification | Anterior longitudinal ligament calcification |
|---|---|---|---|---|---|---|---|---|---|---|
| | Straight curvature | Reflexed curvature | | | Bulge | Hernia-tion | Space narrowing | Hyper-osteogeny | | |
| Control group | 63 (49.60%) | 6 (4.70%) | 61 (48.00%) | 48 (37.80%) | 31 (24.40%) | 39 (30.70%) | 6 (4.70%) | 9 (7.10%) | 24 (18.90%) | 15 (11.80%) |
| Case group | 125 (68.70%) | 13 (7.10%) | 56 (30.80%) | 52 (28.60%) | 34 (18.70%) | 44 (24.20%) | 16 (8.80%) | 18 (9.90%) | 32 (17.60%) | 15 (8.20%) |
| P | 0.001* | | 0.002* | 0.088 | 0.202 | 0.224 | 0.171 | 0.391 | 0.768 | 0.297 |

Note: *P < 0.05 shows that there was significant difference between the groups

### 5.3. Binary logistic regression analysis

Finally, statistically significant variables such as gender, cervical physiological curvature and narrowing of intervertebral space the of two groups were used as independent variables for binary logistic regression analysis. Hosmer-Lemeshow test was P = 0.293, indicating that the constructed model fits well with the real data. The results showed that abnormal cervical physiological curvature and narrowing of intervertebral space were significantly correlated with vertigo. This can be seen in **Table 5**.

## 6. Discussion

Through binary logistic regression analysis of the possible risk factors of cervical vertigo, it is concluded that abnormal cervical physiological curvature and narrowing of intervertebral space are significantly related to the occurrence of vertigo. Attention should be paid to the early detection, prevention and correction of the above-mentioned two factors. The results of imaging examination showed that the risk of vertigo in patients with abnormal cervical physiological curvature was 2.607 times higher than that in patients with normal cervical physiological curvature, and the risk of vertigo in patients with narrowed intervertebral space was 0.431 times higher than that in patients with normal intervertebral space. Abnormal cervical physiological curvature is an independent risk factor for cervical vertigo, and intervertebral space narrowing is correlated with cervical vertigo, but is not a risk factor for vertigo. The correlation analysis results are inconsistent with previous theories, which may be due to the selection of control group. Patients with cervical lesions but without vertigo in the control group are bound to include more cervical disc

herniation in the control group. Artificial selectivity increases the incidence of intervertebral space stenosis in the control group. But on the one hand, it also indicates that the correlation between cervical vertigo and disc herniation deserves further study. Previous theoretical studies have suggested that disc herniation is one of the causes of cervical vertigo [3]. It was found in the experimental study Ruffini's corpuscle of the diseased intervertebral discs were sensitive to the prosperity of inflammatory factors, and the abnormal proprioceptive information was misintroduced. They were mismatched with the normal proprioceptive information generated by the normal afferent vestibular and other sensory systems, and a large number of abnormal proprioceptive information was introduced into the vestibular nucleus, and they were mismatched with the normal proprioceptive information transmitted by the vestibular or other sensory systems [4]. In this study, patients with cervical lesions and without vertigo symptoms were selected in the control group, but the proportion of narrowing of intervertebral space was greater than that in the case group. The correlation needs to be further solved by more rigorous experimental design and research methods.

**Table 5.** Outcomes of binary logistic regression analysis

| | B | Standard error | Wald | Degree of freedom | Significance | OR | 95% CI | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Lower limit | Upper limit |
| Gender (male) | -0.501 | 0.268 | 3.496 | 1 | 0.062 | 0.606 | 0.359 | 1.024 |
| Physiological curvature of cervical spine (abnormal) | 0.958 | 0.253 | 14.334 | 1 | 0.000* | 2.607 | 1.587 | 4.281 |
| Narrowing of intervertebral space (abnormal) | -0.842 | 0.251 | 11.280 | 1 | 0.001* | 0.431 | 0.264 | 0.704 |
| Constant | 0.233 | 0.227 | 1.055 | 1 | 0.304 | 1.262 | | |

Note: *P < 0.05 shows that there was significant difference between the groups

This study tried to use the method of real-world research and the in-patient case system to retrospectively analyze the risk factors of cervical vertigo and further explore its pathogenesis. The experimental design is a retrospective case-control study. The deficiency of the retrospective study is that the research data is not comprehensive, patient's detailed course of disease and personal information in daily life is insufficient, auxiliary examination data acquisition is relatively passive, it is difficult to objectively reflect the condition comprehensively, there are many confounding factors, and the confounding factors in the study are not well controlled, and source of case is diverse. These are not conducive to the standardization of the cases and modeled.

Future research design should adopt prospective experimental design as much as possible, standardize the source of cases, reduce the influence of confounding factors as much as possible, comprehensively understand the incidence and personal general situation of patients as much as possible in the form of questionnaire design, increase the score of anxiety and depression, understand the influencing factors of

mental psychology, and pay attention to protecting the personal information of patients in the process.

**Funding**

This study was financially supported by Health Research Fund of Shaanxi Province (No.: 2018D018).

**Disclosure statement**

The authors declare no conflict of interest.

**References**

[1] Xue S, Wang X, 2000, What is Cervical Vertigo. Chinese Journal of Spine and Spinal Cord, 9(5): 297.

[2] Neurology Branch of Chinese Medical Association, Editorial Committee of Chinese Journal of Neurology, 2010, Expert Consensus on Vertigo Treatment. Chinese Journal of Neurology, 43(5): 369–374.

[3] Peng B, Yang L, 2017, Pathogenesis of Cervical Dizziness. Medical Journal of the Chinese People Armed Police Forces, 28(05): 433–436.

[4] Yang L, Yang C, Pang X, et al., 2016, Mechanoreceptors in Diseased Cervical Discs and Vertigo. Spine, 42(8): 540–546.