

Data mining based on tonifying kidney to treat vascular dementia prescription drug law

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Abstract: **Objective** Combined with the theory of kidney brain interaction in traditional Chinese medicine, to discuss the medication rule of traditional Chinese medicine in treating vascular dementia of kidney deficiency type from the perspective of kidney. **Methods** The literatures on the treatment of vascular dementia with traditional Chinese medicine were retrieved from CNKI, Wanfang, VIP and other databases from 2012 to 2022. Excel 2019, SPSS Modeler 18.0, SPSS Statistics 25.0 were used for progressive flavor, warp transformation and efficacy analysis. **Results** A total of 131 literatures met the requirements, involving 149 traditional Chinese medicines. The drugs for tonifying deficiency, promoting blood circulation and removing blood stasis, eliminating phlegm and relieving cough and asthma were used more. The main sex tastes were warm and cold, Xin, sweet and bitter, which belonged to the three channels of liver, spleen and kidney. Association rules obtained 16 drug combinations and 4 new prescriptions were clustered. **Conclusion** Treating vascular dementia from kidney has profound theoretical source and remarkable clinical application effect, which can provide support for clinical prescription.

Keywords: Vascular Dementia; Data Mining; Invigorating the Kidney; Medication Rule

Introduction

Vascular Dementia (Vascular Dementia, VD) refers to serious cognitive impairment caused by vascular lesions, which can also be described as vascular cognitive impairment. Vascular dementia accounts for about 20% of the total number of dementia, belonging to the second category of dementia. The clinical manifestations of VD patients are computational power, spatial localization ability, comprehension disorders, etc. [1]. There is no clearly approved medicine for Western medicine treatment of this disease, as a preventable disease, it has more profound clinical value [2].

VD disease in the brain, brain is also known as the sea of pulp, and kidney closely related. so the brain has a controlling effect on the kidney to a certain extent. Therefore, the decline and weakening of the kidney function may lead to the damage of the brain, resulting in the body's cognitive impairment, emotional hyperactivity and other manifestations [3, 4]. In this study, the data mining method was used to summarize the drug use law of clinical treatment of vascular dementia in the past ten years.

1. Data and methods

1.1 Data Mining

1.1.1 Data sources

The clinical research literature on the treatment of vascular dementia with traditional Chinese medicine in CNKI, WangFang, VIP Chinese Journal and other databases were used as search sources.

1.1.2 Inclusion and screening criteria

Inclusion criteria: ① clinical research literature of TCM or integrated Chinese and Western medicine; (2) The intervention measures were internal administration of traditional Chinese medicine compound, with clear drug composition;

Screening criteria: ① animal experiments, reviews, bibliometrics and other articles; ② Articles about famous medical cases, cases and experience;

1.1.3 Data Cleaning

Refer to Chinese Pharmacopoeia (Part 1 of 2020 Edition) ^[5] and Chinese Medicine (9th edition) ^[6] to standardize the input of TCM names.

2. Results

2.1 Data mining results

After screening, 131 prescriptions were obtained, with a total of 149 traditional Chinese medicines, and the total use frequency reached 1518 times. The top 10 Chinese herbs were screened out (Table 1).

Table 1: Top 10 high-frequency drugs for vascular dementia treated by Chinese medicine

Drug	frequency	Drug frequency	Drug	frequency	Drug frequency
Shichangpu	99	66.44%	shanzhuyu	61	40.94%
chuanxiong	74	49.66%	huangqi	58	38.93%
shudihuang	74	49.66%	heshouwu	52	34.90%
danshen	68	45.64%	fuling	50	33.56%
yuanzhi	67	44.97%	yizhiren	45	30.20%

2.1.1 Analysis of drug efficacy, sex, taste and menstruation

The efficacy, sexual taste and warp conversion of 149 traditional Chinese medicines were statistically analyzed, and the results were shown in the figure. (Figure 2).

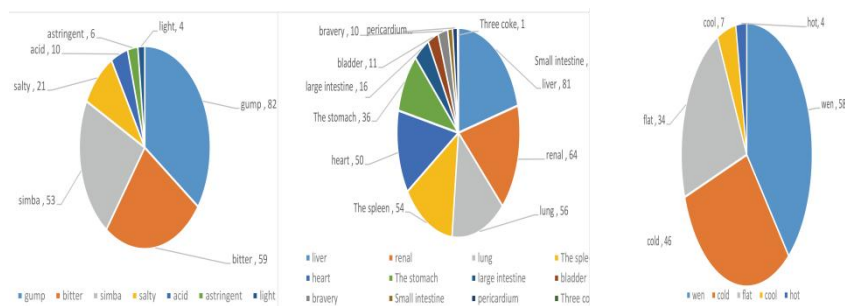


Figure 1: Statistics of the proportion of four Qi, five flavor and channel normalization in the treatment of vascular dementia with Chinese medicine

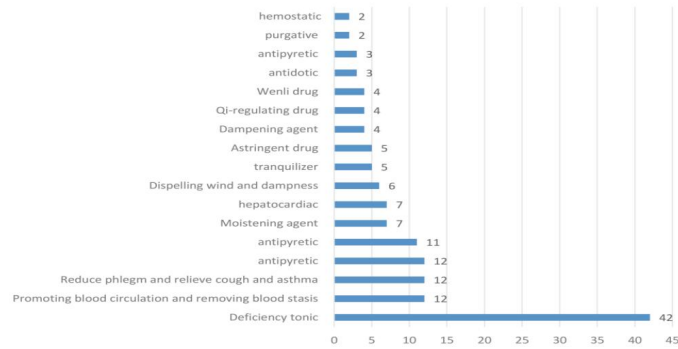


Figure 2: Frequency statistics of efficacy of traditional Chinese medicine in treating vascular dementia

2.1.2 Association Rule analysis

Association rule analysis was performed on 149 traditional Chinese medicines, and the support degree and confidence degree were set to be $\geq 20.00\%$, $\geq 80.00\%$, and the maximum number of the first item was 5.(Table 2).

Table 2: Chinese medicine for vascular dementia associated drug combination

Consequent term	former term	support degree	confidence degree
shichanpu	yuanzhi	51.16%	83.58%
shichanpu	fuling	38.17%	86.00%
shichanpu	yuanzhi-chuanxiong	30.53%	80.00%
shudihuang	roucongrong	26.72%	80.00%
Chuanxiong	huangqi-danshen	26.72%	80.00%
shudihuang	shanzhuyu-yuanzhi	24.43%	87.50%
shichanpu	shanzhuyu-yuanzhi	24.43%	81.25%

3. Results

The main flavor of traditional Chinese medicine is warm and cold, sweet and bitter, mainly attributed to liver and kidney. The theory of the Four Qi and Five tastes originates from "the unity of heaven and man", which holds that man and nature are integral to each other, so the external qi of heaven and earth can affect the body. Gan into the spleen, Gan warm can warm the spleen Yang, spleen and kidney complement each other to tonify kidney Yang. Xin flavor can diverge, Xin temperature can transport spleen Yang, warm kidney dryness. Bitter cold can make kidney function function normally [7, 8]. Therefore, the traditional Chinese medicine into the liver and kidney channels can store blood and replenish essence to maintain the normal work of brain skills. The top of the list of TCM effects include tonifying deficiency, promoting blood circulation and removing blood stasis. The use of high-frequency drugs can be seen that the main etiology and pathogenesis of this disease is kidney deficiency, phlegm turbidity-blood stasis is the pathological factor of occurrence and development, kidney qi deficiency, deficiency of qi, unable to warm and promote blood circulation, blood stasis for a long time, phlegm turbidity-blood stasis obstructs the functioning of brain and viscera. Therefore, the treatment should be based on tonifying kidney deficiency, expelling phlegm and promoting blood stasis.

16 groups of drug combinations were obtained by agreement with the association rules, and the highest support was obtained for Acorus calamus - Polygonum officinalis, among which Acorus officinalis removes phlegm to open the body and stimulate the spirit and intelligence, and Radix officinalis dispelling phlegm to promote the kidney and intelligence, so as to achieve the functions of clearing the body and eliminating phlegm, tonifying the kidney and calming the mind. Studies have shown that Acorus officinalis could clear oxygen free radicals, antioxidants and regulate the cholinergic system [9]. Kidney tonifying and expectorant treatment of VD has good clinical effectiveness and safety, and the clinical symptoms of VD patients are effectively controlled [10]. Modern pharmacology has proved that the main active components of Poria cocos can

effectively regulate oxidative stress and protect neurons ^[11]. Ripe *Rehmannia Rehmanniae* and *cistanche* tonify kidney Yang and invigorating blood. The combination of the two can tonify kidney essence deficiency and brain and marrow deficiency. Traditional Chinese medicine containing ripe *Rehmannia* and *cistanche* can be used to treat VD caused by kidney deficiency ^[12], and tonifying kidney and filling pulp is a traditional Chinese medicine method to treat vascular dementia ^[13]. Chinese herbal compounds of cooked *Rehmannia* and yam can effectively improve hemodynamics and cerebral ischemia and hypoxia in patients with VD ^[14], so the theory of treating VD from kidney is scientific and has been confirmed by clinical experiments ^[15].

Combined with the above views, the treatment of vascular dementia from kidney is reasonable and scientific. The research on prescription rules and new prescriptions has not been verified by experiment, so there are some limitations. In the future, the signal pathway can be verified by experiment.

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