Discussion on the Rule of Drug Use of Flos Puerariae Based on Association Rules

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Abstract. Objective: To explore the compatibility of Flos Puerariae medicine based on association rules and systematic cluster analysis. Methods: The theme of "Flos Puerariae" was from January 1998 to October 1998. It was searched in CKNI and 40 articles were included in the standard. Excel 2013, SPSS Modeler 14.1, SPSS Statistics 19.0 statistics were used. The software is a tool for frequency analysis, association rule analysis and system cluster analysis of Chinese medicines included in the standard. Results: The frequency analysis found that among the 40 groups included in the standard, the single-flavored Chinese medicines Flos Puerariae, Poria, Alisma Rhizoma, Licorice root, tangerine peel, and Hawthorn had the highest frequency; in the statistics of sexual taste, cold, flat, mild and slightly cold were the most common; spleen, stomach, lung, heart, and liver are the most common in the classics; there are 13 kinds of traditional Chinese medicines in the main disease, with alcoholic fatty liver. Conclusion: Using modern information technology, combining traditional Chinese medicine clinical data with big data for deep analysis and integration, it is more convenient to explore the potential compatibility of traditional Chinese medicine, and finally feedback to the clinic, providing a basis for guiding clinical drug development and new prescription research and development.

Introduction

It is a flower of the leguminous plant Pueraria lobata (Willd.) Ohwi or Pueraria thomsonii Benth. It is sweet, mild and has the effect of relieving alcohol and quenching thirst. Modern pharmacological studies have shown that the flower contains alkaloids, flavonoids. The chemical components such as polysaccharides have various pharmacological effects such as hangover, liver protection, anti-oxidation, protection of brain tissue, protection of cardiomyocytes, anti-inflammatory and anti-tumor, etc. [3-5]. In recent years, with the study of its components, Flos Puerariae is also used in animal cerebral ischemia and other research. The application of prescriptions is the characteristic of Chinese medicine treatment. Flos Puerariae often appears in the form of single-drugs in the experimental research of pharmacological effects, while in clinical applications, it is mostly compound. Flos Puerariae Jiejiu Decoction is a compound of Chinese herbal medicine, which can be used for clinical treatment such as hangover drunkenness [6], alcoholism [7] and alcoholic fatty liver [8]. Based on these, using modern information technology, research and summary of traditional Chinese medicine clinical drug data, mining Flos Puerariae compound form of treatment of disease, treatment rules and potential drug combinations, in order to explore new drugs for combination and attending diseases, give full play to The medicinal value of the flower.

Data and Methods

Data Source

With the theme of "Flos Puerariae", the time range was from January 1998 to October 2018. The search was conducted on the CKNI search interface, and a total of 611 documents were retrieved.
Inclusion Criteria
Excluding experimental research, review, combination therapy, no specific drug composition or single-flavored Chinese medicine and other literatures, eliminating the addition and subtraction prescriptions, clinical trials, only select the Chinese medicine prescription clinical research containing Flos Puerariae; finally select the matches from 611 articles. There are 40 standard literatures, and all the Chinese medicines of 40 prescriptions in the literature are entered into Excel 2013 to establish a database containing the Chinese herbal medicines.

Data Processing
The names, classifications, and tastes of the drugs are all regulated according to the Chinese Pharmacopoeia 2015 [9] and Chinese Pharmacy [10], and the Chinese medicines with different names are treated uniformly. For example, if a traditional Chinese medicine has multiple sexual tastes, it will be counted separately. Due to the great changes in the efficacy of traditional Chinese medicine, different artillery products are classified as different drugs. Refer to the "National Standards of the People's Republic of China, TCM Clinical Diagnosis and Treatment Terminology" [11], and classify the diseases treated by the prescriptions.

Statistical Methods
All Chinese medicines that met the criteria were sorted and sorted using Excel2013, SPSS Clementine 12.0, and SPSS Statistics 19.0 for statistical processing.

Results
Single-flavor Chinese Medicine Use
All the Chinese medicines in the 40 Chinese medicine prescriptions were screened, and a total of 179 Chinese medicines were obtained, with a cumulative frequency of 389 times. Among the 179 Chinese medicines, the frequency ≥ 5 has a total of 21 flavors, and the cumulative frequency is 210 times, accounting for 53.98% of the total frequency. Among them, the top three frequencies are Poria, Alisma and licorice root, and Chinese herbal medicines such as valerian, corn mustard and Radix Cynanchi Paniculati appear only once. See Table 1 for details.

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Frequency</th>
<th>Drug Name</th>
<th>Frequency</th>
<th>Drug Name</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flos Puerariae</td>
<td>40</td>
<td>Bupleurum</td>
<td>10</td>
<td>Rheum officinale Baill.</td>
<td>6</td>
</tr>
<tr>
<td>Poria</td>
<td>15</td>
<td>Scutellariae Radix</td>
<td>9</td>
<td>Mongolian milkvetch root</td>
<td>6</td>
</tr>
<tr>
<td>Alisma Rhizoma</td>
<td>14</td>
<td>Salvia miltiorrhiza Bge.</td>
<td>8</td>
<td>Dried rhizome of rehmanniae</td>
<td>5</td>
</tr>
<tr>
<td>Licorice root</td>
<td>14</td>
<td>Amomum villosum Lour.</td>
<td>7</td>
<td>Paeonia lacti flora Pall.</td>
<td>5</td>
</tr>
<tr>
<td>Angerine peel</td>
<td>12</td>
<td>Imperata rhizome</td>
<td>7</td>
<td>Hovenia dulcis Thunb.</td>
<td>5</td>
</tr>
<tr>
<td>Tand Hawthorn</td>
<td>12</td>
<td>Aucklandia lappa Decne</td>
<td>7</td>
<td>Pueraria</td>
<td>5</td>
</tr>
<tr>
<td>Atractylodes macrocephala Koidz.</td>
<td>11</td>
<td>Amomum kravanh Pirre ex Gagnep</td>
<td>7</td>
<td>Artemisia capillaris Thunb.</td>
<td>5</td>
</tr>
</tbody>
</table>

The Use of Medicinal Property and Flavor
According to the 2015 edition of the "Chinese Pharmacopoeia" classification standard, the statistical analysis of the medicinal taste of 21 traditional Chinese medicines with frequency ≥ 5 was carried out. Statistics show that the taste of 21 Chinese herbal medicines with frequency ≥ 5 is related to sweet, pungent, bitter and sour, cold, mild, slightly warm, slightly cold and cold. The statistical results show that the 21-flavor Chinese medicine with frequency ≥ 5 has no sexual fever and Chinese medicine with salty and astringent herbs. See Figure 1 for details.
Figure 1. Statistics flavour and properties of a drug (frequency≥5).

**Channel Tropism and Disease Containing of a Drug**

According to the "Chinese Pharmacopoeia" 2015 edition classification standard, the statistical analysis of the use of drugs with frequency ≥ 5 was performed. The statistical results show that the 21 Chinese medicines with frequency ≥5 have 13 different types of classics, and the first five categories with higher frequency are spleen, stomach, lung, liver and heart. See Figure 2 for details.

Figure 2. Channel tropism and statistics of drugs (frequency ≥5,Left).

Figure 3. Distribution of the major functions of a drug (frequency ≥5,Right).

According to the classification standard of TCM diseases in the National Standards of Chinese Medicine and TCM Clinical Diagnosis and Treatment, 40 statistical analysis of the main diseases of the Chinese herbal medicine containing hemiptera chinensis can be seen that there are 13 common clinical diseases of TCM in the main diseases. Among them, alcoholic fatty liver is the most common. See Figure 3 for details.
Analysis of High Frequency Drug Association Rules [12,13]

Using SPSS Clementine 12.0 statistical software to analyze the correlation rules of high frequency drugs (using frequency $\geq 5$), use Apriori modeling to further explore the compatibility relationship between different Chinese medicines, set the support degree to 20%, the confidence level is 87.5%, the maximum before the number of items is 3, and the potential drug combinations in common prescriptions are excavated under conditions of $\geq 1$, and a total of 8 core drug combinations are obtained. The lift of all drug combinations was greater than 1, indicating that these drug combinations are statistically significant. The statistical results of the eight core drug combinations are shown in Table 2. The high-frequency drugs (frequency of use $\geq 5$) are associated with the “networked display” shown in Figure 4.

![Association network display between drugs (frequency $\geq 5$)](image)

**Figure 4.** Association network display between drugs (frequency $\geq 5$).

Discussion

In the frequency analysis, the single-flavor Chinese medicine *Flos Puerariae*, *Poria*, and *Alisma* can be obtained. The three traditional Chinese medicines have the highest frequency, and the alcoholic fatty liver and liver diseases can be obtained most in the main disease. Correlation rule analysis can study the interdependence of traditional Chinese medicine. In this paper, a total of 8 combinations of drugs with the highest combined strength are obtained.

Traditional Chinese medicine has a long history and huge data. Using modern information technology to process existing data, discovering potential commonalities, and mining the prescriptions is one of the new models of modern Chinese medicine inheritance [15]. Commonly based on new computer technology, the author summarizes the experience of traditional Chinese medicine clinical medicine, analyzes the common prescriptions, condenses his academic thoughts, discovers commonalities and proposes innovation, and finally feeds back to the clinic, guides clinical medication, serves patients, and is more likely to find diseases. The law of occurrence and development, the trend of change, combined with the idea of "treating the disease" of Chinese medicine to serve the society.

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References


