Analysis of Characteristics of Traditional Chinese Medicines for Treating Dysmenorrhea Based on Data Mining

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Abstract. Objective: To analyze the symptom classification and medication characteristics of Chinese medicine in the 2015 edition of Chinese Pharmacopoeia, and to provide reference for rational use of drugs by clinicians, and to provide ideas for the development of new drugs for dysmenorrhea. Methods: The Chinese patent medicine for the treatment of dysmenorrhea in the 2015 edition of the Chinese Pharmacopoeia was collected. The statistical analysis of the drug composition, dosage form characteristics and precautions was carried out using Excel 2013 and SPSS Modeler 14.1 statistical software. Results: A total of 55 Chinese patent medicines were involved, involving 159 kinds of traditional Chinese medicines, of which the highest frequency of angelica application was 29 times; 50% of traditional Chinese medicines had a pungent taste, 62.9% of Chinese medicines were liver-transfer; 36.4% of Chinese patent medicines were pills. Conclusion: At present, in the treatment of dysmenorrhea, blood stasis and detoxification are still the main factors; a total of 14 core drug pairs are obtained, including Angelicae Sinensis Radix—Corydalis Rhizoma, Angelicae Sinensis Radix—Chuanxiong Rhizoma, Angelicae Sinensis Radix—Paoniae Radix Alba, Angelicae Sinensis Radix—Cyperi Rhizoma, Chuanxiong Rhizoma—Rehmanniae Radix Praeparata and so on.

1. Introduction

Dysmenorrhea is a common gynecological disease, usually with periodic abdominal pain in women before or after menstruation, accompanied by nausea and vomiting, dizziness and hiccups [1]. In the case of Chinese medicine, it belongs to the category of “running abdominal pain”, which is caused by the refusal of rushing; or the loss of uterus due to maintenance [2-3]. Dysmenorrhea is also closely related to mood and interpersonal relationships [4-5]. Every generation of medicines have a deep understanding of dysmenorrhea, and in the treatment, they focus on conditioning the air machine and performing blood sputum [6-7]. With the changes in the understanding of dysmenorrhea by ancient physicians, the use and treatment of drugs have also changed. Therefore, this paper analyzes the Chinese patent medicines for the treatment of dysmenorrhea contained in the Chinese Pharmacopoeia, and analyzes the characteristics of the syndromes of traditional Chinese medicines in the treatment of dysmenorrhea, the characteristics of medication, and provides ideas for the development of new drugs for dysmenorrhea, and promotes the development of Chinese patent medicines in the treatment of dysmenorrhea.

2. Analysis of the Characteristics of the Treatment of Dysmenorrhea

The functional indications of 55 kinds of Chinese patent medicines for treating dysmenorrhea included in the 2015 edition of the Chinese Pharmacopoeia were summarized and analyzed. The results are shown in Table 1.

In summary, the current Chinese medicines for the treatment of dysmenorrhea in the market, the treatment of qi and blood stasis type of dysmenorrhea most, accounting for 69.1%; followed by treatment of qi and blood deficiency type of dysmenorrhea, accounting for 36.4%; and treatment of liver and kidney loss of dysmenorrhea There are fewer Chinese patent medicines, only three. Therefore, the development of Chinese patent medicines for the treatment of liver and kidney loss type and cold and damp dysmenorrhea, to make up for the huge vacancies in the current market is the top priority of R & D workers.
Table 1. Classification of Chinese Medicines for Treating Dysmenorrhea.

| Dysmenorrhea type               | Number of Chinese patent medicines | percentage |
|---------------------------------|------------------------------------|------------|
| Qi and blood stasis type        | 38                                 | 69.1%      |
| Cold and damp stagnation        | 4                                  | 7.3%       |
| Liver stagnation                | 8                                  | 14.5%      |
| Qi and blood deficiency type    | 20                                 | 36.4%      |
| Liver and kidney loss           | 3                                  | 5.5%       |

3. Analysis of the Composition Characteristics of Traditional Chinese Medicine for Dysmenorrhea

3.1 Characteristics of Chinese Medicine Varieties

The composition of 54 kinds of Chinese patent medicines for treating dysmenorrhea (except for the composition of Dingkun Dan) is analyzed. A total of 159 kinds of traditional Chinese medicines are involved. The top 30 Chinese medicines in the cumulative frequency are shown in Table 2, and 77 kinds of Chinese medicines appear once.

Table 2. Frequency of Application of Traditional Chinese Medicine for Dysmenorrhea.

| traditional Chinese medicine | frequency | percentage |
|------------------------------|-----------|------------|
| Angelicae Sinensis Radix     | 29        | 52.7%      |
| Corydalis Rhizoma            | 25        | 45.5%      |
| Paeoniae Radix Alba          | 22        | 40.0%      |
| Chuanxiang Rhizoma           | 21        | 38.2%      |
| Cyperi Rhizoma Rehmanniae    | 19        | 34.5%      |
| Atractylodis Macrocephalae   | 17        | 31.0%      |
| Glycyrrhizae Radix Et        | 15        | 27.3%      |
| Poria                        | 12        | 21.8%      |
| Leonuri Herba                | 12        | 21.8%      |
| Cinnamomi Cortex             | 11        | 20.0%      |
| Aucklandiae Radix            | 10        | 18.2%      |
| Spatholobi Caulis            | 10        | 18.2%      |
| Angelicae Dahuricae Radix    | 10        | 18.2%      |
| Moutan Cortex                | 9         | 16.4%      |
| Scutellariae Radix           | 9         | 16.4%      |
| Paeoniae Radix Rubra         | 9         | 16.4%      |
| Dipsaci Radix                | 8         | 14.5%      |
| Codonopsis Radix             | 8         | 14.5%      |
| Salviae Miltiorrhizae Radix  | 8         | 14.5%      |
| Rhei Radix Et Rhizoma        | 5         | 9.1%       |
| Astragali Radix              | 8         | 14.5%      |
| Citri Reticulatae Pericarpium| 7         | 12.7%      |
| Amomi Fructus                | 7         | 12.7%      |
| Notoginseng Radix Et Rhizoma | 7         | 12.7%      |
| Dioscoreae Rhizoma           | 6         | 10.9%      |
| Carthami Flos                 | 6         | 10.9%      |
| Asini Corii Colla            | 6         | 10.9%      |
| Rehmanniae Radix             | 5         | 9.1%       |
| Curcumae Rhizoma             | 5         | 9.1%       |
| Rhei Radix Et Rhizoma        | 5         | 9.1%       |
As can be seen from Table 3, the frequency of Angelicae Sinensis Radix is the highest, 29 times, accounting for 52.7%. Followed by Corydalis Rhizoma, Paeoniae Radix Alba and Chuanxiong Rhizoma, respectively, 25, 22, and 21 times. Through the search of 159 kinds of traditional Chinese medicines involved, except for the 28 pharmacopoeia, the functional indications clearly indicated that 29 kinds of traditional Chinese medicines can be used to treat dysmenorrhea, accounting for 22.0%. It can be seen that the treatment of dysmenorrhea is not a single menstruation and pain relief, but also needs to start from the cause, syndrome differentiation and treatment, in order to achieve the desired effect.

3.2 Characteristics of Four Gas and Five Flavors

According to the Pharmacopoeia, 132 Chinese medicines were classified, and the results are shown in Figure 1. 44.7% of the traditional Chinese medicines for treating dysmenorrhea are mild drugs, and the cool drugs are the least. 50% of Chinese medicine has a pungent taste, 50% of Chinese medicine has a bitter taste, 39.4% of Chinese medicine has a sweet taste, and very few have a sour and salty taste. "Su Wen • Dirty Law Theory" contains: “Xin San, acid harvest, sweet, hard, salty and soft” [9], “bitter” can vent, dry, strong, and able to warm, can be hair, can be inferior and other aspects. According to the statistics of its five flavors, the traditional Chinese medicine for treating dysmenorrhea is in line with the principle of treating blood and removing phlegm and removing cold evil. In addition to statistics of its return, it can be seen that the return to the liver is more, followed by the kidney, spleen. The basic theory of Chinese medicine believes that the occurrence of gynecological diseases mainly lies in blood and gas, belonging to the liver, kidney and spleen [10]. Therefore, the traditional Chinese medicine composition of the Chinese patent medicines that constitute dysmenorrhea is consistent with the basic theory of Chinese medicine.

![Figure 1. Frequency Statistics of the Compositional Traits of Traditional Chinese Medicine for Dysmenorrhea.]

3.3 Core Drug Combination

Using SPSS Modeler 14.1 statistical software to analyze association rules, use network to display the association between drugs, use Apriori modeling to further explore the compatibility relationship between drugs, set the support degree to 20%, the confidence is 85%, the maximum before The number of items is 5, and the potential drug combinations in the commonly used prescriptions are excavated under conditions of ≥1, and a total of 14 core drug pairs are combined. The overall drug combination lift was greater than 1, indicating that it is statistically significant. The core drug pair combination is shown in Table 3, associated with “networked display” (Shown in figure 2). Note: the thickness of the line indicates the strength of the correlation between the two drugs).

4. Treatment of Dysmenorrhea Chinese Patent Medicine Matters Needing Attention

Among the 55 Chinese patent medicines for the treatment of dysmenorrhea contained in the Chinese Pharmacopoeia, 19 kinds of proprietary Chinese medicines did not indicate the precautions, and the remaining 36 kinds of proprietary Chinese medicines can be roughly divided into six kinds.
The details are shown in Table 4 below.

Table 3. Analysis of Association Rules Between Drugs.

| Drug combination                                      | Support   | Confidence | Lifting degree |
|-------------------------------------------------------|-----------|------------|----------------|
| Angelicae Sinensis Radix-Corydalis Rhizoma            | 47.727%   | 85.714%    | 1.3            |
| Angelicae Sinensis Radix-Chuanxiong Rhizoma           | 47.727%   | 100.0%     | 1.517          |
| Angelicae Sinensis Radix-Paeoniae Radix Alba          | 45.455%   | 90.0%      | 1.366          |
| Angelicae Sinensis Radix-Cyperi Rhizoma               | 43.182%   | 89.474%    | 1.358          |
| Chuanxiong Rhizoma-Rehmanniae Radix Praeparata        | 38.686%   | 88.235%    | 1.849          |
| Angelicae Sinensis Radix-Rehmanniae Radix Praeparata  | 38.686%   | 94.118%    | 1.428          |
| Paeoniae Radix Alba-Rehmanniae Radix Praeparata-Angelicae Sinensis Radix | 36.364%   | 87.5%      | 1.925          |
| Chuanxiong Rhizoma-Rehmanniae Radix Praeparata-Atractylopidis Macrocephalae Rhizoma | 36.364% | 93.75% | 1.964 |
| Angelicae Sinensis Radix-Attractylopidis Macrocephalae Rhizoma | 34.091% | 86.667% | 2.243          |
| Rehmanniae Radix Praeparata-Atractylopidis Macrocephalae Rhizoma | 34.091% | 100.0% | 1.517          |
| Rehmanniae Radix Praeparata-Atractylopidis Macrocephalae Rhizoma-Angelicae Sinensis Radix | 34.091% | 86.667% | 2.243          |
| Angelicae Sinensis Radix-Cyperi Rhizoma-Corydalis Rhizoma | 34.091% | 93.333% | 1.416          |
| Paeoniae Radix Alba-Rehmanniae Radix Praeparata-Chuanxiong Rhizoma | 34.091% | 86.667% | 1.907          |
| Angelicae Sinensis Radix-Paeoniae Radix Alba-Chuanxiong Rhizoma | 34.091% | 100.0% | 1.517          |

Figure 2. Linkage Network Display Between Drugs.

Table 4. Classification and Frequency Statistics of Chinese Medicines for Treating Dysmenorrhea.

| Precautions                      | The number of occurrences | percentage |
|----------------------------------|---------------------------|------------|
| Symptom taboo                    | 15                        | 41.7%      |
| Incompatibility                  | 0                         | 0%         |
| Special population               | 32                        | 88.9%      |
| Dietary contraindications        | 6                         | 16.7%      |
| Remind attention                 | 2                         | 5.6%       |
| Adverse reactions                | 3                         | 8.3%       |
However, there are no incompatibility taboos. According to reports in the literature, Aifu warming pill, Danggui Tiaojing pill, female Jindan and so on combined with amphetamine-type western medicine, which contains the sedative effect of Chuanxiong Rhizoma and the agitation of amphetamine, will reduce the efficacy; Sanqi Xueshenning Capsule, etc. Sanqi preparation should not be combined with isoproterenol-like western medicine. The corticosteroid-like substance contained in the Sanqi preparation will increase the toxicity of isoproterenol to the heart. The Sanqi type preparation should not be combined with lomefloxacin or nib. Methril is used in combination. Otherwise it will cause liver damage. In summary, the precautions for the use of the 55 kinds of proprietary Chinese medicines need to be further improved, and the corresponding incompatibility contradictions should be clarified to guide patients to safe medication.

5. Discussion

However, for foreign reports, the incidence rate is 43%-90%, and the domestic high incidence rate is 33.1 %. The 55 Chinese medicines for treating dysmenorrhea contained in the Chinese Pharmacopoeia are far from meeting the market demand. In addition, according to statistical analysis, among the 55 Chinese patent medicine formulas for treating dysmenorrhea, the frequency of occurrence of Angelicae Sinensis Radix sinensis was the highest (29 times); followed by Corydalis Rhizoma, Paeoniae Radix Alba, Chuanxiong Rhizoma respectively, 25, 22, and 21 times. From the analysis of sexual taste, 44.7% are mild drugs, and cool drugs are the least; 50% of Chinese medicines have a pungent taste, 50% of Chinese medicines have a bitter taste, 39.4% of Chinese medicines have a sweet taste, and very few have a sour and salty taste; There are relatively more traditional Chinese medicines for liver and kidney. Through SPSS Modeler 14.1 statistical software for analysis, a total of 14 core drug pairs were obtained, including Angelicae Sinensis Radix- Corydalis Rhizoma, Angelicae Sinensis Radix - Chuanxiong Rhizoma, Angelicae Sinensis Radix - Paeoniae Radix Alba, Angelicae Sinensis Radix - Cyperi Rhizoma, Chuanxiong Rhizoma - Rehmanniae Radix Praeparata and so on.

Therefore, this paper through the induction of statistics on the treatment of dysmenorrhea Chinese patent medicine, preliminary analysis of its medication rules, provide a reference for clinical rational drug use, provide ideas for the development of new drugs for dysmenorrhea, and promote the development of Chinese patent medicine in the treatment of dysmenorrhea.

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