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Discuss the Treatment of Melasma Meridian in Traditional Chinese Medicine Based on Data Mining Technology

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Abstract: Objective: To study the treatment of chloasma in traditional Chinese medicine. Methods: The famous TCM prescriptions for chloasma treatment in the retrieved literature were collected and analyzed by Excel software, and the frequency number analysis, cluster analysis, and association rule analysis were performed by SPSS 26 and SPSS Modeler 18 software. Results: Tongue is mainly pale and thin white, mainly thin pulse, with 173 drugs, including 24 traditional Chinese medicine, tonifying deficiency medicine, and activating blood circulation; drugs are mainly liver, lung, spleen and kidney meridian. Conclusion: In terms of syndrome differentiation, "liver and kidney deficiency of qi and blood and blood stasis" is the main clinical syndrome, and "liver and kidney tonifying, blood circulation and blood stasis" should be used throughout the treatment of chloasma patients. When grouping, the drug group "lotus herb and Astragalus Astragalus" analyzed by association rules can be used to improve the clinical effect.

Chloasma is an acquired pigmented skin disease, which is usually found on the forehead, eyebrows, cheeks, lips and other parts. It is a light brown or brown patch with smooth surface, different shapes and sizes, clear boundary, and the patch will be aggravated in summer [9]. Its pathogenesis is mainly related to the increase of tyrosinase activity, melanocyte and melanosome production, etc. In contemporary families of traditional Chinese medicine, the viscera involved in the onset of chloasma are relatively unified, believing that they have negligible connection with the liver, spleen, and kidney, and their symptoms are deficiency, real, or virtual and real diseases. Although all doctors have a more unified understanding, however, in the specific treatment and prescription the selection of drugs are different, and the potential drug rules and the four diagnoses are not clear, data mining, as a known and unknown data analysis method, has been gradually applied to TCM literature research in recent years, the complex understanding of chloasma can be combed and explained by data mining methods, Including four diagnosis, dialectical treatment, prescription selection and other rules, Through the specific data presentation, Can make clinicians to understand and learn the TCM chloasma cases from another dimension, To make the better

inheritance of traditional Chinese medicine, To improve the efficacy of clinical TCM treatment of chloasma.

1. Clinical Data

1.1. Study Subjects

The retrieval time is set to: start the database construction until December 2020.

The search databases are: CNKI, Wanfang database, Traditional Chinese medicine books collected in the library collection, China biomedical literature Service system, and VIP database. The search contents are as follows: the included works take traditional Chinese medicine as the main treatment mode of chloasma and medical cases in the journal literature, and record the medical case data using Excel to construct the chloasma medical case data.

1.2. Inclusion of the Exclusion Criteria

Data inclusion criteria: the medical cases selected by (1) must be clearly diagnosed as chloasma; (2) included medical cases including complete basic information, chief complaint, current history, TCM diagnosis, dialectical treatment, etc.; (3) medical cases must take oral Chinese medicine decoction as the main treatment method, complete prescription drugs and measurement. (4) symptoms have improved significantly, with a significant effect.

Data exclusion criteria: (1) repeated literature in different databases, excluding incomplete medical records; (2) medical treatment literature; (3) internal and external treatment, or only external treatment, including TCM external applications, acupuncture, ointment application, etc.; (4) prescriptions in specific case.

2. Research Methods

2.1. Database Establishment

Chloasma medical database establishment, mainly using Microsoft Excel software for medical specific diagnosis and treatment data information extraction, including case number, name, gender, age, time, diagnosis, doctor name, course, main accompanying symptoms, original tongue, original pulse, original syndrome, original treatment, internal Chinese medicine prescription, taking method, etc.

2.2. Preprocessing of the Melasma Medical Case Database

2.2.1. Specification of Symptoms, Syndrome, etc

The expression of symptoms in successive dynasties is not the same, so the different terms of symptoms used in medical cases need to be standardized. For details, we can refer to [1] of The Clinical Diagnosis and Treatment Terminology Certificate Section in China. For example, whether "high fever, low fever, afternoon hot flashes" are unified as "fever": Western medicine symptoms are uniformly expressed as the symptoms of traditional Chinese medicine, such as "loss of appetite" is uniformly described as "no stay", etc.

2.2.2. Specification of Traditional Chinese Medicine

Chinese medicine names of traditional Chinese medicine alias, spellings, abbreviations, etc.,

specific can refer to Gao Xuemin editor[2] of the Chinese medicine textbook, such as cooked to ripe flava, honey ephedra to ephedra, barley, stalk, stalk, wild chrysanthemum to chrysanthemum, etc., the processing method is different or select different parts and make different drugs is still according to the original name, such as rehmannia after nine steamed nine sun processed for cooked rehmannia, efficacy partial blood filling essence is still recorded for cooked.

2.2.3. Language Transformation of Data

In the statistical analysis, because the computer cannot recognize the information of Chinese characters, so the input data information should be converted to the computer recognized 1 and 0, using 1 to indicate existence and 0 to indicate absence.

2.2.4. Statistical Analysis

Frequency, number analysis, and cluster analysis were all performed through the IBM spss Statistics 26 data analysis software, and the association rule analysis was performed by the IBM spss moderler18.0 data analysis software.

3. The Results of the Study

3.1. Inclusion of Medical Cases

Under the double screening of inclusion criteria and exclusion criteria, 114 medical patients with 288 clinic cases were finally included in this study.

3.2. Distribution Pattern of Tongue Images and Pulse Images

In the included medical cases, there are 13 kinds of tongue mass, 10 kinds of tongue quality, and 23 kinds of tongue image. In the tongue moss description, the top three times were "moss thin white" accounting for 35.6%, "moss" for 13.3%, and "moss white" for 11.1%. The top three cases in the tongue description were "the tongue pale" for 29.8%, "tongue dark" for 28.9%, and "red tongue dark" for 21.9%.(See Table 1)

Table 1: Distribution of tongue images in melasma cases

Tongue picture	Percentage	Moss like	Percentage
Pale tongue	24.4	Moss thin white	35.6
The tongue is dark	17.8	Moss less	13.3
The tongue dark red	17.8	Moss white	11.1
Red tongue	17.8	Moss thin yellow	11.1
Pink tongue	11.1	The moss is thick and greasy	4.4
The tongue is pointed red	2.2	Moss thin	4.4
Tongue light dark	2.2	Moss white thick	2.2
The tongue is pale	2.2	Moss white slippery	2.2
Tongue light purple	2.2	Moss thick greasy	2.2
Purplish tongue	2.2	Moss yellow thick	2.2
		Greasy fur	2.2
		The moss is slightly yellow and greasy	2.2
		Slightly fat	2.2

In the pulse images, there are 12 pulse types, among which the top three types are "string vein" accounting for 15.5%, "submerged veins" accounted for 13.5%, and "fine veins" and "string vein"

accounted for 10.3% respectively. (See Table 2)

Table 2: Pulse distribution in the melasma doctor case

Pulse condition	Percentage	Pulse condition	Percentage
String fine	16.8	String astringent	2.6
Heavy fine	16.1	String count	1.9
Thin	10.3	String sink	1.9
Chord	10.3	Fine astringent	1.9
Net amount	9	Fine slippery	1.9
Sliding	6.5	Sedimmed	1.9
Sink	5.2	Slim	1.9
Heavy slow	4.5	Heavy late weak	1.9
Puckery	3.2		

3.3. Distribution Law of the Syndrome

Among the included medical cases, there were a total of 27 TCM syndromes, among which the top five cases were: 39 cases of liver and kidney deficiency (13.4%), 22 cases of liver depression and qi stagnation (7.6%), 19 cases of liver depression and spleen deficiency (6.5%), 16 cases of qi stagnation and blood stasis (5.5%), and 14 cases of qi deficiency and blood stasis (3.1%) of blood stasis. (See Table 3)

Table 3: Distribution of syndrome in melasma cases

Syndrome	Percentage	Syndrome	Percentage
Liver and kidney deficiency	13.4	Sputum stasis knot each other	2.1
Stagnation of qi due to depression of the liver	7.6	Disorder of charge	1.4
Stagnation of liver-qi with deficiency of the spleen	6.5	Pathogenic fire derived from stagnation of liver-qi	1.4
Qi-stagnancy and blood stasis	5.5	Asdthenic splenonephro-yang	1.4
Blood stasis due to qi deficiency	3.1	The mind lost	1.4
Qi yu kidney deficiency	3.8	Blood heat blood stasis knot	1.4
Asthenia of both the spleen and kidney	3.5	Meridian barrier	1
Deficiency of qi and blood	3.4	Fire and blood stasis	1
Deficiency of both vital energy and yin	4.7	Wind heat attack on the table	1
Disharmony between qi and blood	1.7	Blood stasis and dampness and heat	1
His temper is deficient	2.8	Deficiency of the kidney yin	1
Kidney water pan	2.4	Failure of skin and muscle to be nourished	0.7
Splenasthenic fluid-retention	2.4	Liver stagnation	0.7
Blood deficiency clip stasis	2.1		

3.4. Analysis of Symptom Clustering

The cluster analysis of the high frequency symptoms present in the database (see Figure 1) showed that the tree map suggests that the high frequency drugs fall into three stable classes when

the Euclidean distance is 2. (See Table 4)

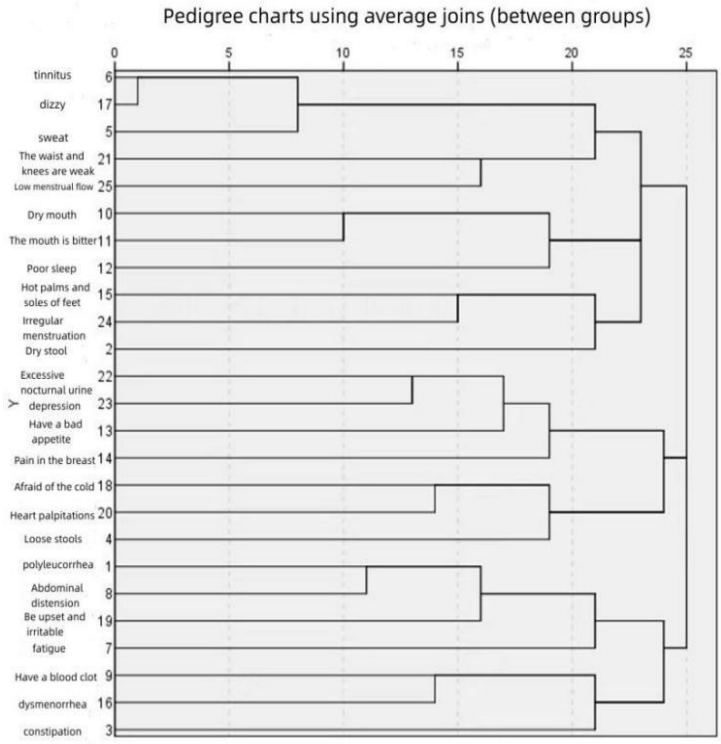

Figure 1: A dendrogram of symptoms clustering in the melasma doctor case

Table 4: Symptom cluster analysis in melasma cases

Clustering	Form
C1	Tinnitus, dizziness, more sweating, soft waist and knee acid, less menstruation, dry mouth, bitter mouth, poor sleep, hot hands, foot and heart, irregular menstruation, then dry
C2	Nocturia, depression, fatigue, breast pain, fear of cold, palpitations, loose stool
C3	More leucorrhea, bloating, irritability, fatigue, blood clots, dysmenorrhea, constipation

The symptoms of group C1 can be caused by liver and kidney deficiency, deficiency of qi and blood, qi stagnation, and blood stasis, so the onset of chloasma can be manifested as liver and kidney deficiency and deficiency of qi and blood.

The symptoms of the C2 group can be caused by Yang deficiency of the spleen and kidney, and wind evil attack, so they are closely related to the formation of melasma.

C3 group symptoms may be due to the exuberant hepatic fire caused by constipation. Hot inside disturb the heart god, then see irritable.

3.5. Frequency of Chloasma Drugs

The collated data for frequency analysis and took high frequency drugs to rank the following table. (See Table 5)

Table 5: Frequency of high-frequency drugs in melasma doctor cases

N.p	Frequency	Percentage	N.p	Frequency	Percentage
Angelica sinensis	121	5.2	Motherwort	50	2.2
Liquorice	88	3.8	Rhizoma cyperi	49	2.1
Bighead atractylodes rhizome	82	3.5	Radix paeoniae rubrathe root of common peony	45	1.9
Ligusticum wallichii	77	3.3	Angelica dahurica benth. Et hook	40	1.7
Poria cocos	73	3.1	Bark of tree peony root	39	1.7
Carthamus tinctorious	71	3.1	Dried rehamnnia root	38	1.7
Radix bupleuri	70	3	Fructus aurantii	35	1.5
Radices paeoniae alba	69	3	Prepared rehmannia root	34	1.5
The root of red-rooted salvia	61	2.6	Chinese yam	31	1.3
Fructus ligustri lucidi	53	2.3	Codonopsis pilosula	30	1.3
Peach kernel	53	2.3	Eclipta alba	30	1.3
The seed of chinese dodder	51	2.2	Astragalus mongholicus	30	1.3

The following figure is obtained from the classification of the drugs in the table. It can be seen from Figure 2, the frequency of supplementing deficiency drugs was the highest, followed by promoting blood circulation and removing blood stasis medicine, relieving surface medicine, regulating qi medicine, clearing heat medicine, benefiting water and seeping wet drugs, etc. It shows that doctors in the treatment of chloasma to fill the deficiency, promote blood circulation and remove blood stasis.

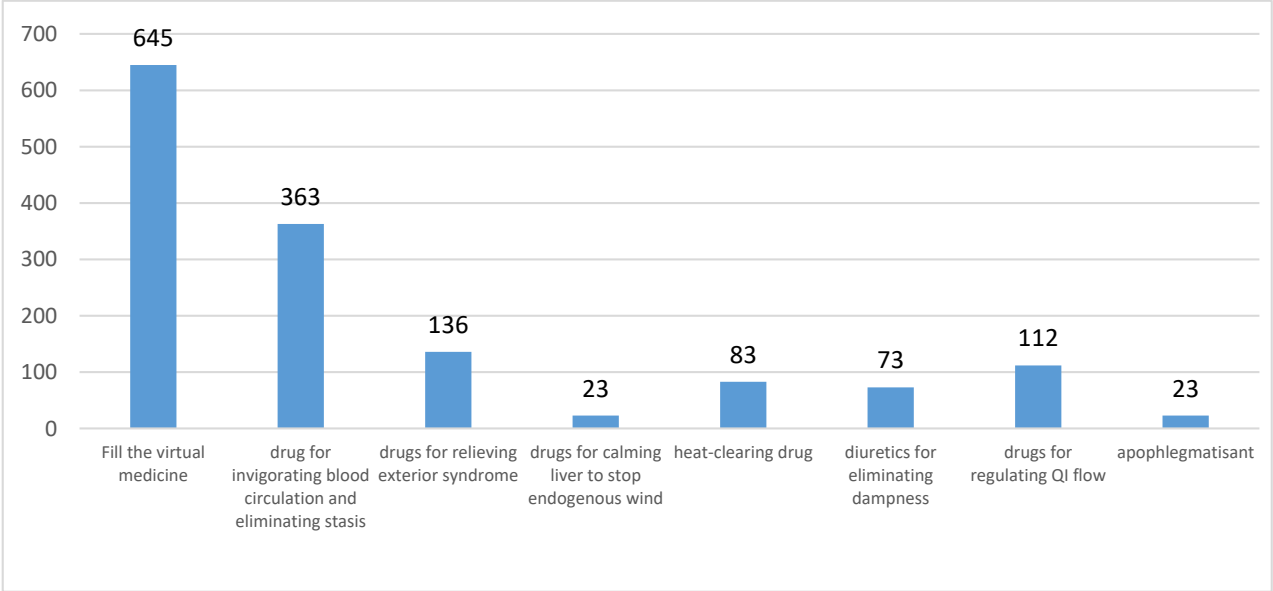

Figure 2: Bar chart of high-frequency drug classification in the melasma doctor case.

3.6. Analysis of Channel Tropism of High-Frequency Traditional Chinese Medicine for External Treatment of Chloasma

The high frequency drugs used externally to treat chloasma mainly focus on the liver, lung,

spleen, and kidney meridians; the highest frequency of liver meridian is 37 times, followed by 24 times of lung meridian, 20 times of spleen meridian and 18 times of kidney meridian. Therefore, the pathogenesis and treatment of chloasma are closely related to the liver, lung, spleen, and kidney (Figure 3).

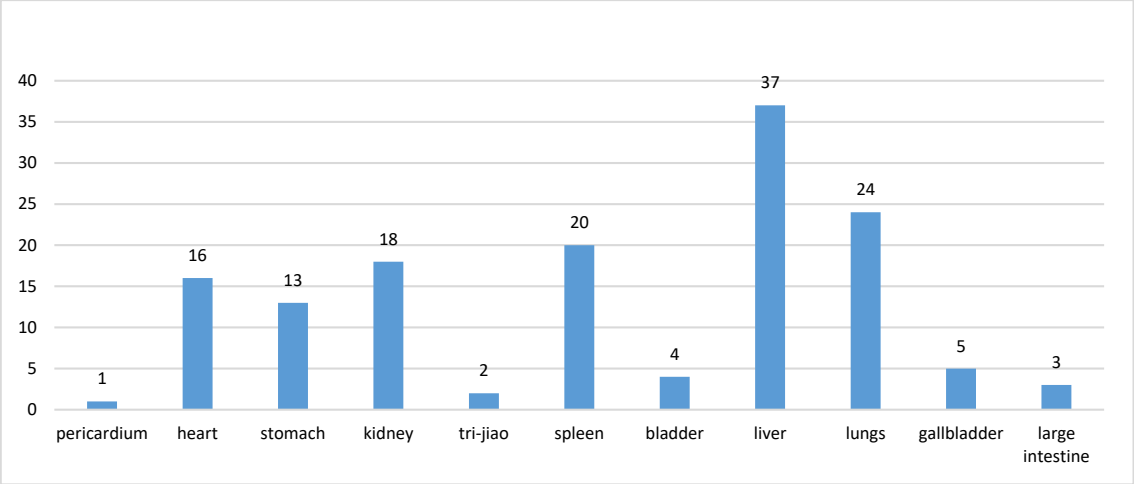

Figure 3: Bar chart of high-frequency drugs in the case of melasma doctor.

3.7. High-Frequency Drug Clustering Analysis (Figure 4)

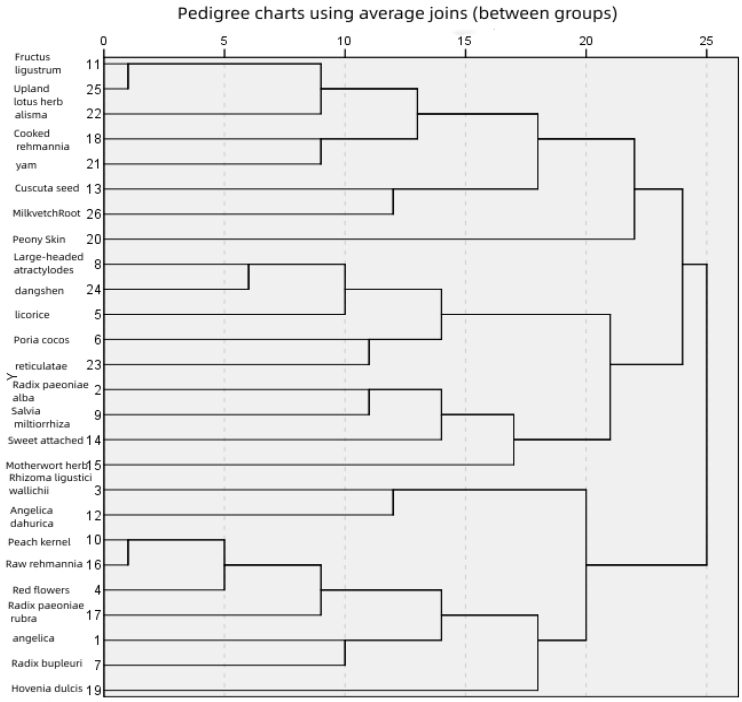

Figure 4: Dendrogram of high frequency drug clustering in the melasma case.

The cluster analysis shows that the tree graph suggests that high frequency drugs split into stable 5 classes when the Euclidean distance is 2. (See Table 6)

Table 6: High-frequency drug cluster analysis

Clustering	Form
C1	Privet, lotus grass, water, ripe rehmannia, yam, dodder, astragalus
C2	Bark of tree peony root
C3	Atractylodes, dangshen, licorice, poria cocos, tangerine peel
C4	White peony root, salvia miltiorrhiza, incense attachment, and motherwort
C5	Peach kernel, rehmannia, safflower, red peony, angelica, bupleurum, fructus tus, angelica dahurica, chuanxiong

In the C1 group, mainly virgin seed, dry lotus grass, dodder and cooked rehmannia can treat liver and kidney deficiency and kidney essence deficiency, yam can supplement spleen loss, treat qi deficiency and weakness, and Ze diarrhea has the effect of benefiting water infiltration and dampness.

Peony skin in group C2 has the effect of clearing away heat and cooling blood, promoting blood circulation and removing blood stasis, and reducing deficiency and heat.

Group C3 has the meaning of poria cocos, which is the main prescription for the treatment of chloasma of spleen and stomach qi deficiency.

In the C4 group, white peony root nourishes liver and Yin, benefiting motherwort to promote blood circulation and regulate menstruation, Dangshen tonifying qi, and spleen and stomach, eliminating irritation and thirst, the effect of tonifying liver and kidney, and clearing the heart and calming the mind.

In the C5 group, there were mainly peach kernel, safflower, red peony root, Angelica sinensis, and chuanxiong, all of which were drugs to promote blood circulation and remove blood stasis, with the meaning of peach decoction decoction and clinical peach decoction[3]. It is important prescription for treating chloasma blood stasis type.

3.8. High-Frequency Drug Association Rule Analysis

Using SPSS Modeler 18 software for association rule analysis, set the minimum condition support of 10%, minimum rule confidence of 50%, the maximum number of previous items is 2, using Apriori algorithm to analyze the association rules in the treatment of chloasma, and finally obtained 10 drugs for association rules (see Table 7 and Figure 5); the highest support of 30.77%, followed by astragalus, Dangshen and Poria cocos. And make the network graph according to the association rule data.

Table 7: High-frequency drug associations in melasma medical cases

Antecedent	Consequent	Support (%)	Confidence (%)
Eclipta alba	The rhizome of oriental water plantain	30.77	93.75
Eclipta alba	Astragalus mongholicus	28.85	100
Dangshen + poria cocos	Bighead atractylodes rhizome	28.85	86.67
Dang shen + bai shu	Liquorice	26.92	100
Dang shen + licorice	Bighead atractylodes rhizome	26.92	92.86
Dangshen + poria cocos	Liquorice	26.92	85.71
Lotus grass + salvia miltiorrhiza	Fructus ligustri lucidi	26.92	85.71
Dry lotus grass + white peony root	Fructus ligustri lucidi	25	92.30
Ze diarrhea + white peony root	Angelica sinensis	25	84.61

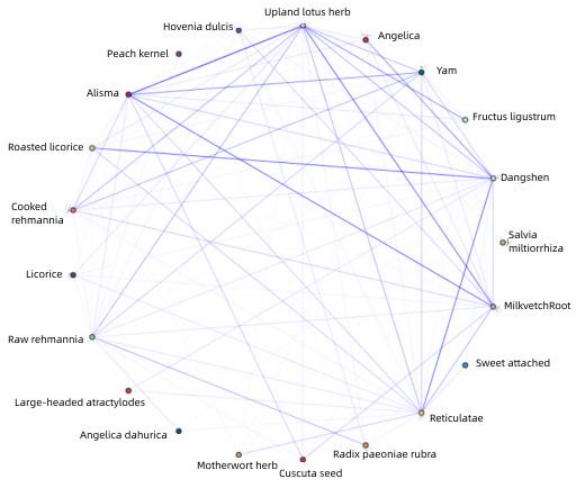

Figure 5: Network diagram of drug association rules

4. Discussion

Chloasma is a kind of disuring skin disease, often in middle-aged Asian women, the slow course of disease, easy to relapse, bring serious psychological burden to patients[4]. Modern medicine believes that the common causes of chloasma are mainly caused by the body's own hormone level, sunshine, cosmetics and thermal stimulation. Its pathogenesis is mainly related to the increase of tyrosinase activity, melanocyte and melanosome production[10]. Modern medicine believes that melasma is closely related to family inheritance, ultraviolet radiation and age growth. Traditional Chinese medicine believes that the cause is the dysfunction of qi and blood in the viscera. Various famous experts in ancient and modern times have different understanding of the etiology of this disease, but they all believe that the pathogenesis of this disease is caused by the dysfunction of viscera and the inability of qi and blood to rise[11], Through the contemporary treatment of Chinese medicine, everybody chloasma medical data for detailed analysis, we can get chloasma patients with four characteristics, and medication rule, patients with chloasma tongue like tongue "light", "dark tongue", "red tongue" more, and tongue coating "moss thin white" appear most, more visible chloasma in patients with virtual evidence and blood stasis. Considering the tongue coating, it is not difficult to see that patients with chloasma mainly show liver and kidney deficiency, and more patients have heat symptoms, which may feel the evil of wind and heat at the beginning of the course of the disease, or heal liver qi and stagnation and liver depression and heat due to the disease. The treatment of chloasma is mainly based on "depression" and "internal environment" imbalance [12-14]. The cooked land is warm and sweet, enters the liver and kidney meridians, and has the effect of nourishing blood, nourishing yin, and filling lean marrow. It can be used in combination with angelica to enhance the effect of nourishing blood[15]. In terms of pulse images, "fine strings" accounts for 16.8%, "fine fine" accounts for 16.1%, and "fine" accounts for 10.3%. It can be seen that "fine strings", "thin" and "fine" pulse images occupy the majority, "meridian" said: fine is blood gas decline. Therefore, patients with chloasma should mainly supplement qi and benefit blood, relieve liver, and supplement liver, and the pulse subsidence rules should consider tonifying the kidney and warming Yang. The analysis of the syndrome shown by chloasma patients also shows that liver and kidney deficiency is 13.4%, liver depression and qi stagnation is 7.6%, and liver depression and spleen deficiency is 6.5%. The importance of liver and kidney, qi and blood treatment is fully in line with the manifestations of pulse phenomena. Symptoms of poor sleep,

upset, irritability, irregular clip blood clots, fatigue, breast pain, menstruation, these symptoms have reached more than 50% of the total frequency, most of these symptoms are mostly liver and kidney deficiency and blood stasis, so "tonifying liver and kidney, blood stasis" method should be during the treatment of chloasma throughout.

Through association rule analysis, the most closely associated drug group "Lotus herb + Ze diarrhea + Astragalus agalus" was finally obtained through visual analysis of traditional Chinese medicine. Modern pharmacological studies show that L. melus sp[5] its extracts have various pharmacological activities, such as hemostasis and liver protection, immune regulation, and anti-inflammatory effects on the cardiovascular system, and have the effect of inhibiting melanin synthesis. About diarrhea "tonic" said, "mirror" volume four said: "diarrhea can produce kidney qi."It shows that Ze diarrhea has the effect of tonic. At the same time, it has the effect of infiltration, diuresis, and detumescence, proved by pharmacological studies in recent years[6]. It also has the effect of lowering blood lipid, reducing plasma viscosity and inhibiting atherosclerotic plaque. Meanwhile, jerdisease also has the effect of protecting liver preservation, anti-inflammation, antioxidant damage, immune regulation, and so on. Astragalus mongholicus[7], It can promote nucleic acid metabolism and improve renal function and renal histopathological changes. Modern research shows that[8] in melasma patients, the peroxidation lipid is increased in serum, and astragalus can reduce the peroxidation lipid content in serum.

The analysis of the data of a famous Chinese medicine chloasma treatment cases enabled us to deeply learn and understand the characteristics of contemporary Chinese medicine chloasma prescriptions from different dimensions, to provide a reference for clinical prescription selection. But due to the limited number of literature included, and the involved number of TCM medical case distribution, the analysis results may have certain bias risk, so can only provide reference for TCM treatment of chloasma, the future data mining research should collect longer number of years, more number, wider sources of Chinese medicine treatment of chloasma, to more fully show the doctors from dialectical to prescription commonness and personality.

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