中医杂志

CLINICAL STUDY

Traditional Chinese Medicine syndrome-related herbal prescriptions in treatment of malignant tumors

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Abstract

OBJECTIVE: To investigate the distribution characteristics of TCM syndromes and the related herbal prescriptions for malignant tumors (MT).

METHODS: A clinical database of the TCM syndromes and the herbal prescriptions in treatment of 136 MT patients were established. The data were then analyzed using cluster and frequency analysis.

RESULTS: According to the cluster analysis, the TCM syndromes in MT patients mainly included two patterns: deficiency of both *Qi* and *Yin* and internal accumulation of toxic heat. The commonly-prescribed herbs were Huangqi (*Astraglus*), Nüzhen-

zi (*Fructus Ligustri Lucidi*), Lingzhi (*Ganoderma Lucidum*), Huaishan (*Dioscorea Opposita*), Xiakucao (*Prunella Vulgaris*), and Baihuasheshecao (*Herba Hedyotidis*).

CONCLUSION: Deficiency of *Qi* and *Yin* is the primary syndrome of MT, and internal accumulation of toxic heat is the secondary syndrome. The herbs for *Qi* supplementation and *Yin* nourishment are mainly used, with the assistance of herbs for heat-clearance and detoxification.

INTRODUCTION

With the advancement of modern industry and the aging of population, the annual incidence of malignant tumors is increasing. Malignant tumors have always been a serious threat to human health. Complementary and alternative medicine (CAM) has gradually gained popularity in the United States and European countries over the last decades.[1] Traditional Chinese Medicine (TCM), a CAM originated in China, has been widely used for treatment of malignant tumors in China. As an adjuvant therapy, TCM can reduce the toxicity and adverse reactions induced by surgery, chemotherapy and radiotherapy, and can act synergistically with them. So, TCM is often used together with or after these therapies to prolong survival time of the patients and improve their quality of life.[1,2] Even though TCM has been widely used in treatment of MT, it still

falls behind modern Western Medicine in terms of mechanism elucidation and evidence-based data. Data mining, a novel research approach, has appeared with the development of database and artificial intelligence technology. Data mining of TCM has been reported to analyze how herbal medicines are prescribed for MT patients based on the syndrome differentiation, which will help to explore the implicit, previously unknown rules about the "disease syndrome differentiation herbal prescription".[3,4]

Cluster analysis and association rule are the two useful tools used for TCM data mining.[5,6] They can be used to discover the relationships between the valuable descriptive data and minimize the subjective errors, which will increase the validity of the results. In the present study, a clinical database of TCM syndromes and herbal prescriptions was established. So, we can then classify the common-seen syndromes of MT using cluster analysis and frequency analysis, and have further discussions on MT pathogenesis and the therapeutic methods.

METHODS

General data

The data for the 136 pathologically confirmed MT patients with 379 visits from November 2005 to January 2011 at the Second People's Hospital Affiliated to Fujian University of TCM were retrieved, and the records for the patients' symptoms, tongues, pulses and use of Chinese herbs (a structured data analysis) were analyzed.

These patients visited the outpatient department of our hospital for a total of 379 person/times to receive TCM treatment after informed consent. Eighty one of the 136 cases were male (59.56%) and 55 were female (40.44%), with an age range from 15-81 years old (mean, 55). The patients had a variety of tumors, including gastrointestinal cancer (74/136, 54.41%), head and neck cancer (14/136, 10.29%), lung cancer (15/136, 11.03%), breast cancer (8/136, 5.88%), urogenital cancer (7/136, 5.15%), and hematopoietic malignancy (18/136, 13.24%). The treatment regimens included surgery and TCM (35/379, 9.23%), chemotherapy and TCM (157/379, 41.42%), radiotherapy and TCM (15/379, 3.96%), targeting therapy and TCM (12/379, 3.17%), and TCM therapy alone (160/379, 42.22%).

Diagnostic criteria

All the diagnoses were pathologically confirmed. The diagnosis and treatment of malignant tumors was based on guidelines issued by Chinese Anti-Cancer Association.[7]

Diagnostic criteria for TCM syndromes: Definition of TCM syndromes: the TCM syndromes fall into 9 primary patterns,[8-13] that is, *Qi* deficiency, phlegm-damp,

blood stasis, *Qi* stagnation, *Yin* deficiency, *Yang* deficiency, blood deficiency, phlegm-heat, and toxic heat. The diagnostic criteria are as follows:

1) *Qi* deficiency: these patients are usually low in spirit and reluctant to talk, accompanied by fatigue, low speaking tone, enlarged tongue, and vacuous pulse.

2) Phlegm-damp: these patients usually have cough, white sputum, chest tightness, fluid retention of the chest, pale tongue with greasy coating, and soft pulse.

3) Blood stasis: these patients usually have tingling pain, dry stool, purple and blue tongue with stasis maculae or spots, and stringy-like or rough pulse.

4) *Qi* stagnation: these patients usually have tightness of the chest, abdominal distention, likes to sigh, red tongue with white coating and stringy-like pulse.

5) *Yin* deficiency: these patients usually feel hot in the heart, palms, and soles, with dry mouth and throat, night sweating, red tongue with thin coating, and thin and rapid pulse.

6) *Yang* deficiency: these patients usually have a cold feeling. The temperature of the upper and lower extremities is low. Swelling of the face, light red tongue with moist coating, and deep and slow pulse can be observed. They may also have nocturia.

7) Blood deficiency: these patients usually present with pale face, palpitation, poor sleep, light red tongue with thin coating, and thin and weak pulse.

8) Phlegm-heat: cough, yellow sputum, dry stool and brown yellowish urine, red tongue with yellow-greasy coating, slippery and rapid pulse.

9) Toxic heat: these patients usually present with fever, soreness and pain of the whole body, dry mouth, constipation, scanty urine, hot flash, red tongue with yellow-greasy coating, thin and stringy-like pulse.

Classification of syndromes: the patients may have one of the above 9 patterns if they present with at least 3 symptoms of the corresponding pattern, and one patient may have one or more patterns at the same time.

Statistical analysis

The patients were first classified by simple syndrome differentiation and then by complex syndrome differentiation. Microsoft Excel 2003 (Microsoft Corporation, Redmond, WA, USA) was used for data entry, and SPSS 12.0 statistical software (Statistical Product and Service Solutions Inc., Chicago, IL, USA) for data analysis.

If a same syndrome was described with different words by different physicians, the words used in the Diagnostics of TCM[14] were adopted. Similarly, when different names were used by different physicians for a same herb, the name used in the Science of Chinese Pharmacology was adopted.[15] The frequencies of each TCM symptom and Chinese medicinal herb were calculated. The SPSS 12.0 software was applied for hierachical clustering analysis (HCA) when the frequency of Chinese medicine was greater than 30%. HCA involves hierarchically grouping[16] of samples on the basis of simi-

larity without using previous information about these groupings.

TCM terms are transformed into Boolean value in order to seek frequent sets of herbal prescription compatibility by employing Aprioir algorithm in data mining technology so that the rules implied in malignant tumors can be found. Association rule refers to: the rule R: A=>B, which satisfies A∩B=φ & sup (R)≥min_sup & conf (R)≥min_conf. A and B are item (or attribute) sets; sup (R) is the support of rule R; min_sup is the minimum support threshold; conf (R) is the confidence of the rule R; min_conf is the minimum confidence threshold. Antecedent and consequent are Chinese medicines,support was greater than 10% , confidence was greater than 80%.

RESULTS

Distribution of TCM syndromes

Of 379 visits by the 136 MT patients treated with TCM, simple syndrome appeared only in 4.22% (16/379), while complex syndromes were found in 95.78% (363/379). The patients with malignant tumors in this series had a variety of syndromes, including *Qi* and *Yin* deficiency complicated by toxic heat (298/379, 78.63%), *Qi* stagnancy complicated by blood stasis (41/379, 10.82%), deficiency of *Qi* complicated by phlegm - dampness (25/379, 6.60%), and damp-heat complicated by stagnancy of toxin (15/379, 3.96%). These results indicated that the physical condition of the patients with malignant tumors was poor due to metastasis of the tumors and multiple treatments. Hence these patients usually had complex syndromes (Table 1).

Frequencies of Chinese herbs the prescribed and the characteristics of their combination

210 species of Chinese medicinal herbs were prescribed 4882 species/times. Among them, 32 species were used in more than 30% of the prescriptions, altogether 3740 species/times (Table 2). These herbs were classified by using HCA. The results showed that they could be mainly divided into 2 groups (Figure 1). The Figure

1 dendrogram shows that Huangqi (*Astraglus*), Lingzhi (*Ganoderma Lucidum*), Huaishan (*Dioscorea Opposita*) and Nüzhenzi (*Fructus Ligustri Lucidi*) form a cluster, and then aggregate with Xiakucao (*Prunella Vulgaris*) and Baihuasheshecao (*Herba Hedyotidis*). This indicates a focus on "nourishing *Qi*, blood and *Yin*", and "clearing toxic heat" and "supplementing gastrointestinal functions". According to TCM theory, this combination has the characteristic of "treating both the symptoms and the root cause". Furthermore,with the moderate property, Gancao (*Glycyrrhiza Uralensis*) has the effect of "harmonizing" the other herbs, therefore, it appears in all the prescriptions. The first group includes the herbs for Reinforcing *Qi* and *Yin*, i.e., Huangqi (*Astragalus*), Nüzhenzi (*Fructus Ligustri Lucidi*), Lingzhi (*Ganoderma Lucidum*) and Huaishan (*Dioscorea Opposita*). The second group includes the herbs for clearing heat and detoxifcation, i.e., Xiakucao (*Prunella Vulgaris*) and Baihuasheshecao (*Herba Hedyotidis*). Table 3 shows the association rules of the 6medicinal herbs. Support and confidence are the major statistics computed for the association rule. This framework is known as the support confidence framework for association rule mining. The support value indicates the frequency in which A occurs with B. Confidence indicates the probability of B occurring under the condition that A is also present. These are defined as follows:

sup (R) =P (AUB) (1)

conf (R)=P (B|A) (2)

For example: Huangqi (*Astragalus*) ->Nüzhenzi (*Fructus Ligustri Lucidi*) (support=89.71% , confidence= 96.47%). "*Astragalus*" is the antecedent and "*Fructus Ligustri Lucidi*" is the consequent. This shows that there is a 89.71% probability that *Astragalus* will appear with *Fructus Ligustri Lucidi* in the herbal prescriptions. Furthermore, there is a 96.47% probability that *Fructus Ligustri Lucidi* will be prescribed after *Astragalus*.

Use of herbs in patients with different tumors: when the between-group linkage was greater than 25, it was not clustered in any specific grouping. This result may indicate that the selected 32 herbs were all commonly-used for patients with different types of malignant tumors.

Table 1 Distribution of different TCM syndromes in different tumors

Type	TCM syndrome (*n*)			
	Qi and *Yin* deficiency due to heat-toxic	*Qi* Stagnancy and blood stasis	Deficiency of *Qi* and phlegm and dampness	Damp-heat stagnancy toxin
Head and neck cancer	21	4	0	1
Lung cancer	43	5	3	0
Breast cancer	12	3	4	0
Gastrointestinal cancer	171	25	15	7
Urogenital cancer	8	1	2	2
Hematopoietic malignancy	27	3	1	5

Note: TCM: Traditional Chinese Medicine.

Table 2 Frequency distribution of commonly used Chinese medical herbs for malignant tumors

No.	Chinese medical herb	Frequency	Percentage (%)	No.	Chinese medical herb	Frequency	Percentage (%)
1	Gancao (*Radix Glycyrrhizae*)	346	9.25%	17	Dangshen (*Radix Codonopsis Pilosulae*)	61	1.63%
2	Huangqi (*Astragalus*)	342	9.14%	18	Banxia (*Rhizoma Pinelliae, Tuber Pinelliae*)	57	1.52%
3	Nüzhenzi (*Fructus Ligustri Lucidi*)	338	9.04%	19	Shengdi (*Radix Rehmanniae Exsiccata*)	54	1.44%
4	Huaishan (*Dioscorea Opposita*)	333	8.90%	20	Danggui (*Radix Angelicae Sinensis*)	47	1.26%
5	Lingzhi (*Ganoderma Lucidum*)	297	7.94%	21	Kushen (*Sophora Flavescens*)	47	1.26%
6	Baizhu (*Rhizoma Atractylodis Macrocephalae*)	203	5.43%	22	Baishao (*Radix Paeoniae Alba*)	46	1.23%
7	Fuling (*Radix Cynanchi Atrati*)	178	4.76%	23	Shancigu (*Pseudobulbus Cremastrae Seu Pleiones*)	44	1.18%
8	Baihuasheshecao (*Herba Hedyotidis*)	156	4.17%	24	Yuanhu (*Rhizoma Corydalis*)	43	1.15%
9	Shengshaishen (*Panax Ginseng*)	147	3.93%	25	Yujin (*Curcuma Aromatica Salisb*)	41	1.10%
10	Xiakucao (*Prunella Vulgaris*)	147	3.93%	26	Chenpi (*Pericarpium Citri Reticulatae*)	38	1.02%
11	Jiaogulan (*Herba seu radix gynostemmatis*)	140	3.74%	27	Fushen (*Radix Pini in Poria*)	38	1.02%
12	Shancigu(*Cornus Officinalis*)	102	2.73%	28	Qianshi (*Semen Euryales*)	36	0.96%
13	Gouqi (*Lycium Chinense*)	98	2.62%	29	Shashen (*Radix Glehnia*)	35	0.94%
14	Shihu (*Herba Dendrobii Nobilis*)	88	2.35%	30	Shudi (*Radix Rehmanniae Preparata*)	35	0.94%
15	Maidong (*Radix Liriopes Spicatae*)	72	1.93%	31	Wuyao (*Radix Linderaei*)	33	0.88%
16	Yiyiren (*Semen Coicis*)	67	1.79%	32	Zhike (*Fructus Aurantii*)	31	0.83%

Note: percentage of occurring = (frequency of Chinese medicine÷total times)×100%.

Use of herbs in patients with different TCM syndromes: Figure 2 shows the dose of the six herbs used for different TCM syndromes. The large dose of the tonic prescriptions (*Astragalus, Fructus Ligustri Lucidi, Ganoderma Lucidum, Dioscorea Opposita*) were mostly used for patients with *Qi* and *Yin* deficiency complicated by toxic heat, whereas the large dose of the prescriptions for clearing away heat and detoxification (*Prunella Vulgaris, Herba Hedyotidis*) were mostly used in the patients with damp-heat complicated by stagnancy of toxin.

DISCUSSION

Cancer is a disease with complex etiologies. It may develop in different organs and tissues of the human body.[17] Treatment of cancer is still a great challenge. Modern medicine divides cancer into various types according to their location of growth, for example, nasopharyngeal cancer, lung cancer, breast cancer, gastrointestinal cancer, and leukemia, etc. Instead of focusing on the specific type of the disease, TCM puts greater emphasis on the specific pattern of TCM "syndromes". TCM syndrome, a profile with a series of symptoms and signs as the clinical phenotype, plays an important role in understanding the human homeostasis and guiding the application of Chinese herbs and acupuncture. TCM treatment begins with "syndrome differentiation". A specific disease may show different TCM syndromes, and different diseases may have an identical syndrome. So, the classical TCM therapeutic principle, i.e., "same disease treated by different therapies" or "different diseases treated by same therapy",[18] is usually adopted. Based on the principle of "different diseases treated by same therapy", the patients who have undergone tumor resection, postoperative chemotherapy, radiotherapy or immunotherapy, or even the patients who can not tolerate the above therapies can be treated by TCM based on syndrome differentiation.[19]

From the results of the analysis on use of different herbs for different cancers and syndromes, we found that there was no direct relationship between the herbs used and the cancer types, but there was close relationship between the herbs used and the syndrome patterns. 45.25% of the patients received the combined treatment of TCM and radio- or chemotherapy. Radio- or chemotherapy is targeting the "disease (cancer)", and TCM treatment is adopted for the toxic reduction

Table 3 Association rules of Chinese medical herbs

|	Association rule	Support(%)	Confidence(%)
Astragalus	*Fructus Ligustri Lucidi*	89.71	96.47
	Dioscorea Opposita	88.39	97.91
	Dioscorea Opposita + Fructus Ligustri Lucidi	85.49	99.07
	Ganoderma Lucidum	78.89	99.00
	Ganoderma Lucidum + Fructus Ligustri Lucidi	78.36	98.99
	Ganoderma Lucidum + Dioscorea Opposita	77.84	98.98
	Ganoderma Lucidum + Dioscorea Opposita + Fructus Ligustri Lucidi	77.31	98.98
	Rhizoma Atractylodis Macrocephalae	54.35	92.23
	Rhizoma Atractylodis Macrocephalae + Dioscorea Opposita	49.34	98.40
	Rhizoma Atractylodis Macrocephalae + Fructus Ligustri Lucidi	49.08	97.85
Fructus Ligustri Lucidi	*Astragalus*	90.50	95.63
	Dioscorea Opposita	88.39	96.72
	Dioscorea Opposita + Astragalus	86.54	97.87
	Ganoderma Lucidum	78.89	99.33
	Ganoderma Lucidum + Astragalus	78.10	99.32
	Ganoderma Lucidum + Dioscorea Opposita	77.84	99.32
	Ganoderma Lucidum + Dioscorea Opposita and Astragalus	77.05	99.32
	Rhizoma Atractylodis Macrocephalae	54.35	90.29
	Rhizoma Atractylodis Macrocephalae + Astragalus	50.13	95.79
	Rhizoma Atractylodis Macrocephalae + Dioscorea Opposita	49.34	97.33
Ganoderma Lucidum	*Astragalus*	90.50	86.30
	Fructus Ligustri Lucidi	89.71	87.35
	Dioscorea Opposita	88.39	88.06
	Fructus Ligustri Lucidi and Astragalus	86.54	89.63
	Dioscorea Opposita + Astragalus	86.54	89.02
	Dioscorea Opposita + Fructus Ligustri Lucidi	85.49	90.43
	Dioscorea Opposita + Fructus Ligustri Lucidi + Astragalus	84.70	90.34
	Rhizoma Atractylodis Macrocephalae	54.35	82.04
	Rhizoma Atractylodis Macrocephalae + Astragalus	50.13	87.90
	Rhizoma Atractylodis Macrocephalae + Dioscorea Opposita	49.34	89.84
Dioscorea Opposita	*Astragalus*	90.50	95.63
	Fructus Ligustri Lucidi	89.71	95.29
	Fructus Ligustri Lucidi + Astragalus	86.54	97.87
	Ganoderma Lucidum	78.89	98.66
	Ganoderma Lucidum + Fructus Ligustri Lucidi	78.36	98.65
	Ganoderma Lucidum + Astragalus	78.10	98.65
	Ganoderma Lucidum + Fructus Ligustri Lucidi + Astragalus	77.57	98.64
	Rhizoma Atractylodis Macrocephalae	54.35	90.78
	Rhizoma Atractylodis Macrocephalae + Astragalus	50.13	96.84
	Rhizoma Atractylodis Macrocephalae + Fructus Ligustri Lucidi	49.08	97.85
Prunella Vulgaris	*Herba Hedyotidis*	41.43	83.44
	Herba Hedyotidis + Astragalus	40.11	83.55
	Herba Hedyotidis + Fructus Ligustri Lucidi	39.84	85.43
	Herba Hedyotidis + Fructus Ligustri Lucidi + Astragalus	39.05	85.14
	Herba Hedyotidis + Dioscorea Opposita	39.05	84.46
	Herba Hedyotidis + Dioscorea Opposita + Astragalus	38.79	84.35
	Herba Hedyotidis + Dioscorea Opposita + Fructus Ligustri Lucidi	38.26	86.21
	Herba Hedyotidis + Dioscorea Opposita + Fructus Ligustri Lucidi + Astragalus	38.00	86.11
	Herba Hedyotidis + Ganoderma Lucidum	37.20	85.82
	Herba Hedyotidis + Ganoderma Lucidum + Fructus Ligustri Lucidi	36.94	86.43
	Herba Hedyotidis + Ganoderma Lucidum + Astragalus	36.94	85.71
Herba Hedyotidis	*Prunella Vulgaris*	39.05	88.51
	Prunella Vulgaris + Fructus Ligustri Lucidi	38.00	89.58
	Prunella Vulgaris + Astragalus	37.47	89.44
	Prunella Vulgaris + Fructus Ligustri Lucidi + Astragalus	37.20	89.36
	Prunella Vulgaris + Dioscorea Opposita	36.94	89.29
	Prunella Vulgaris + Dioscorea Opposita + Fructus Ligustri Lucidi	36.94	89.29
	Prunella Vulgaris + Dioscorea Opposita + Astragalus	36.68	89.21
	Prunella Vulgaris + Dioscorea Opposita + Fructus Ligustri Lucidi + Astragalus	36.68	89.21
	Prunella Vulgaris + Ganoderma Lucidum	34.57	92.37
	Prunella Vulgaris + Ganoderma Lucidum + Fructus Ligustri Lucidi	34.57	92.37
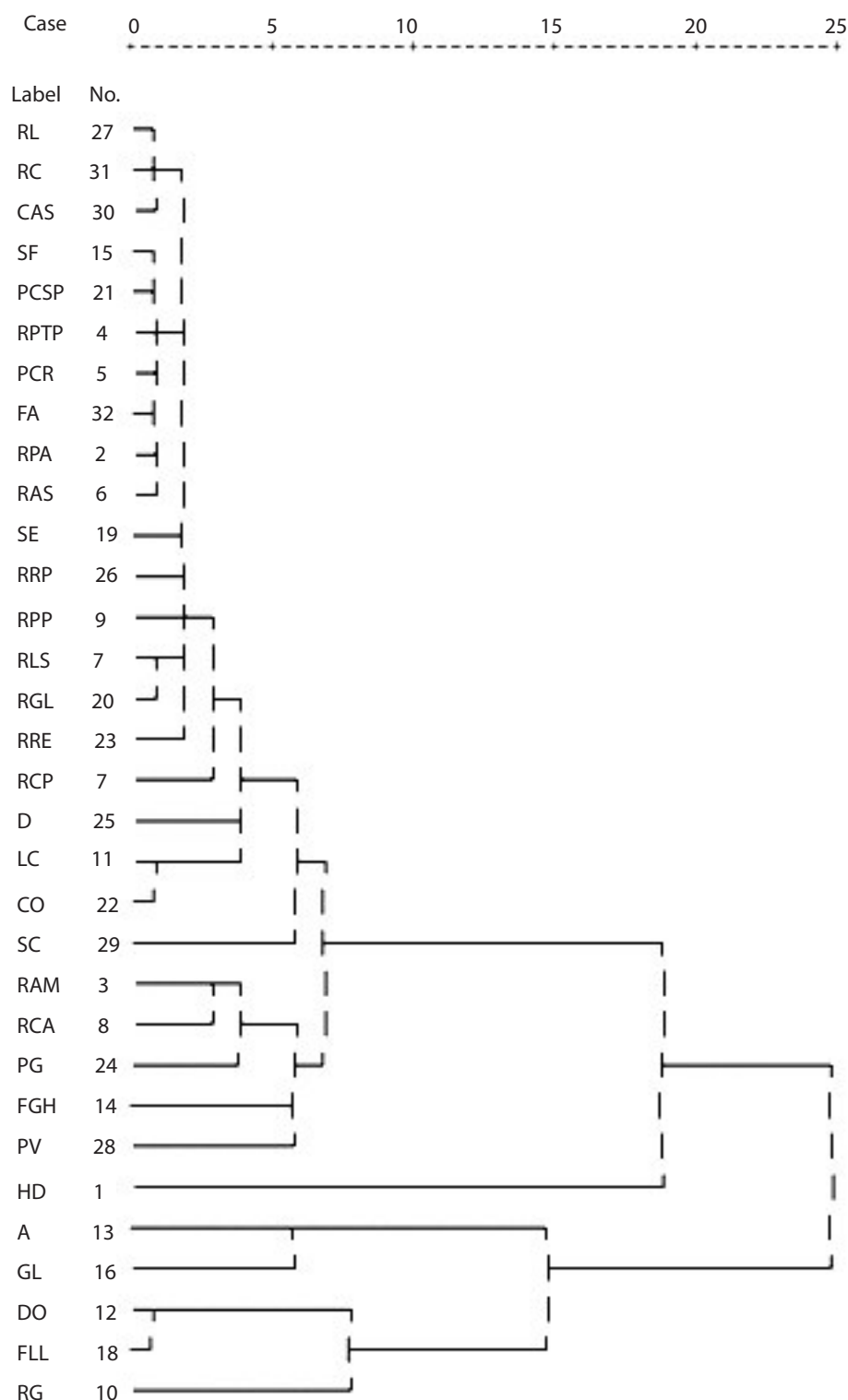
Figure 1 Dendrogram hierarchical analysis for Chinese medicinal herbs

RL: *Radix Linderaei*; RC: *Rhizoma Corydalis*; CAS: *Curcuma Aromatica Salisb*; SF: *Sophora Flavescens*; PCSP: *Pseudobulbus Cremastrae Seu Pleiones*; RPTP: *Rhizoma Pinelliae, Tuber Pinelliae*; PCR: *Pericarpium Citri Reticulatae*; FA: *Fructus Aurantii*; RPA: *Radix Paeoniae Alba*; RAS: *Radix Angelicae Sinensis*; SE: *Semen Euryales*; RRP: *Radix Rehmanniae Preparata*; RPP: *Radix Pini in Poria*; RLS: *Radix Liriopes Spicatae*; RGL: *Radix Glehnia*; RRE: *Radix Rehmanniae Exsiccata*; RCP: *Radix Codonopsis Pilosulae*; D: *Dendrobium*; LC: *Lycium Chinense*; CO: *Cornus Officinalis*; SC: *Semen Coicis*; RAM: *Rhizoma Atractylodis Macrocephalae*; RCA: *Radix Cynanchi Atrati*; PG: *Panax Ginseng*; FGH: *Fiveleaf Gynostemma Herb*; PV: *Prunella Vulgaris*; HD: *Herba Hedyotidis*; A: *Astragalus*; GL: *Ganoderma Lucidum*; DO: *Dioscorea Opposita*; FLL: *Fructus Ligustri Lucidi*; RG: *Radix Glycyrrhizae*.

and symptom alleviation. For the post-operative MT patients in the early stage and the elderly patients with poor physical conditions, the TCM alternative treatment can be adopted. For the patients with refractory cancer or in the late stage but with stable condition the

TCM replacement therapy can be used alone.

Through a long-term clinical observation and follow up, we have found that most of the MT patients may have complex syndromes, that is, "*Qi* and *Yin* deficiency" complicated by "internal accumulation of toxic
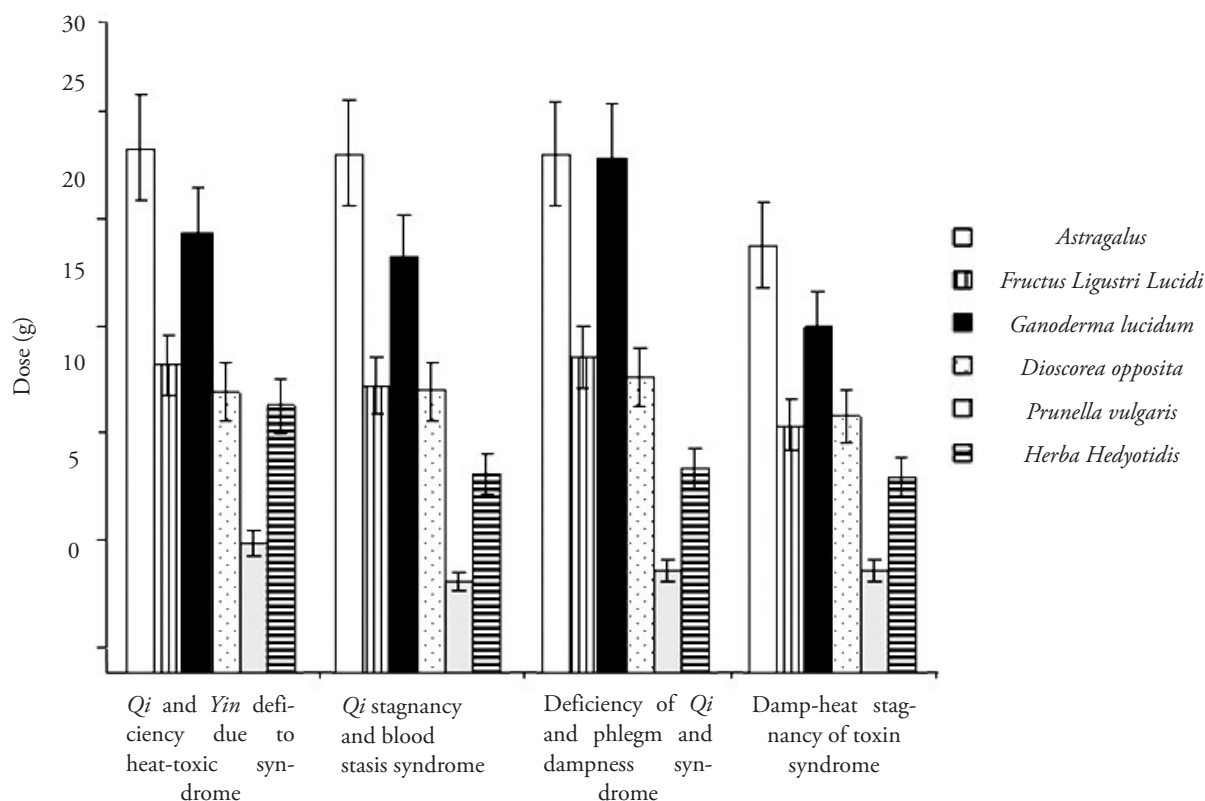
Figure 2 Dose of Chinese medical herbs used for four TCM syndromes
TCM: Traditional Chinese Medicine.

heat". Based on this finding, we suggest that TCM treatment of tumors should be mainly focused on strengthening *Qi* and nurturing *Yin*, and clearing the heat and detoxification.

The cluster analysis and association rule mining of the herbs used for MT patients showed that *Astragalus*, *Fructus Ligustri Lucidi*, *Ganoderma Lucidum*, *Dioscorea Opposita*, *Prunella Vulgaris* and *Herba Hedyotidis* were the 6 frequently-used herbs for "energy-strengthening and toxic, heat- clearing". *Astragalus* is sweet in flavor and warm in nature. "Sweet flavor" can replenish the deficient, so it can replenish the diminished *Qi* after surgery; and "Warm nature" can amend the impaired, so it can reduce the toxic reactions of post-operative radio- or chemotherapy, removing residual poison and promoting wound healing. After several treatment by chemotherapy or radiotherapy; the patients may have severe deficiency of kidney-*Yin*, so, *Fructus Ligustri Lucidi* is used to reinforce the kidney-*Yin*. *Astragalus* and *Fructus Ligustri Lucidi* are the "sovereign herbs", exerting the main effects of the prescription (Sovereign, minister, assistant and attendant are the terms generalizing the effects of the herbs within one prescription in the order of importance). *Ganoderma Lucidum* and *Dioscorea Opposita* are the "minister herbs" with the effect of "strengthening energy" and "nurturing foundation". These effects may help the sovereign herbs in restoring energy, leading to recovery of the physical condition. *Prunella Vulgaris* and *Herba Hedyotidis* are the "assistant and attendant" herbs with "bitter and cold" property, so they have the "heat-clearing and detoxification" and "pain-alleviating" effects. They are able to reduce

or control the tumor size. The combined use of the above herbs may give the effects of "*Qi* supplementation and *Yin* nourishment" along with "heat-clearance and detoxification".[20-21] We constructed previously a three-dimensional structural spectrum of the possible 285 existing compounds of the "nurturing" herbs (*Fructus Ligustri Lucidi* and *Ganoderma Lucidum*) and the "heat-clearance and detoxification" herbs (*Prunella Vulgaris* and *Herba Hedyotidis*). We ran the Ligandfit docking module on Cerius 2 molecular simulation software by Accelrys, and found a successful docking of epidermal growth factor receptor, B-cell lymphoma-extra large, tumor necrosis factor-α, interleukin-2, and cyclooxygenase 2.[22] We propose here the possible mechanism that "energy-strengthening and heat-clearing" may at least induce activation of the immune cells.

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