Rule of Acupoint Combination in Acupuncture Treatment of Xiang Bi Disease: A Study Based on Association Rules

Wenjiao Fu[1,] Shuyue Li[1,] Wanye Zhang[1,] Feng Gao[2,] Zhongyu Zhou[2,*]

[1] *Hubei University of Chinese Medicine, Hubei, China*
[2] *Hubei Province Hospital of TCM, Hubei, China*
Corresponding author. Email: 2209447945@qq.com

ABSTRACT

The database was created through clinical data collection, and the rules of acupoint compatibility of filiform needle acupuncture in the treatment of Xiang Bi disease were studied by association rules. The acupuncture points of needle were extracted from the database, and the Apriori algorithm in SPSS modeler 18.0 was used to analyze the association rules of acupuncture points. Sixty nine acupoints were used in treating Xiang Bi disease with filiform acupuncture, among which 19 acupoints were used more than 10 times. The results of association rules showed that there were 17 groups of compatibility combinations to support above 10% and confidence above 80%, mainly with local acupoints and far and near acupoints. It is feasible to study the compatibility law of acupuncture treatment of Xiang Bi disease based on association rules, and the research results can serve as a basis for clinical practice.

Keywords: Association rules, Filiform needle, Acupuncture, Xiang Bi disease, Compatibility law.

1. INTRODUCTION

Xiang Bi disease (cervical spondylosis) is a disease with a series of clinical manifestations due to the degenerative changes of cervical intervertebral disc and its secondary pathological changes involving the surrounding tissue structure [1]. Clinically, acupuncture, massage, cupping, traction, physiotherapy, internal and external application of drugs are often used to treat Xiang Bi disease. Acupuncture and moxibustion therapy mainly takes acupoints at the cervical vertebra or the site of lesions to achieve the functions of dredging meridians, eliminating edema and relieving nerve compression. It has definite clinical curative effect, less side effects and good patient tolerance. It is a commonly used traditional Chinese medicine treatment method for cervical spondylotic radiculopathy (CRS). Studies have confirmed that acupuncture can improve cervical microcirculation, alleviate the spasm of compressed nerve roots, reduce inflammatory reaction and promote body metabolism. Filiform acupuncture is the most commonly used clinical treatment. Chen Jianhui [2] applied the combination of cervical three needles and

meridian differentiation syndrome differentiation to the clinical treatment of CSR, and achieved good therapeutic effect. Li Jiexin [3] used acupuncture at Cervical Jiaji point to treat patients with CSR. It was found that acupuncture at Cervical Jiaji point can directly stimulate the posterior branch of spinal nerve, promote local blood circulation and eliminate local nerve swelling. The total clinical effective rate was 98.33%. Acupuncture and moxibustion treatment has the advantages of significant curative effect, rapid action, obvious sedative and analgesic effect, low medical cost, simple and easy operation and so on. The traditional acupuncture treatment of Xiang Bi is based on the principle of dispelling wind and dredging collaterals, promoting blood circulation and relieving pain, and commonly used acupoints such as Fengchi, Tianzhu, Jianjing, Dazhu and Ashi [4]. This paper mainly studies the acupoint compatibility law of filiform needle acupuncture in the treatment of Xiang Bi disease.

2. DATA SOURCES AND RESEARCH METHODS

2.1. Data sources

In order to solve the problem of standardization of clinical data collection of acupuncture, realize the integration of clinical scientific research of acupuncture, highlight the characteristics of clinical diagnosis and treatment of acupuncture, it is urgent to standardize and record the clinical operation process of acupuncture, compile the clinical data standard of acupuncture and innovate the data collection technology, build an integrated data collection system of clinical scientific research of acupuncture, and realize the standardization of clinical data of acupuncture. In the research process of this subject, taking Xiang Bi disease as an example, the research group designed "R & D and implementation of TCM clinical scientific research information sharing system based on Xiang Bi disease - clinical observation case report form (CRF). CRF includes 220 indicators such as patient basic information, diagnostic information and treatment information. The data of this study comes from 213 outpatient medical records collected by CRF in 7 hospitals in Wuhan in 2019.

2.2. Case selection criteria

(1) Inclusion criteria:① those who meet the criteria of TCM disease name diagnosed as Xiang Bi disease (TCD Code: bnv261); ② Those who meet the criteria of cervical spondylosis (ICD Code: m47.900x021) and cervical spondylotic radiculopathy (ICD Code: m47.201) diagnosed by western medicine.

(2) Exclusion criteria:① patients with back pain caused by visceral diseases; ③ Patients with clear surgical indications; ④ Patients with severe heart disease, hypertension, liver and kidney diseases and mental diseases; For example, patients with cardiac function above grade II, ALT and AST exceeding the upper limit of normal value by 1.5 times, severe liver and kidney dysfunction, and psychosis; ⑤ Physical weakness, or pregnancy, planned pregnancy, pregnant women, etc; ⑥ The researchers considered it inappropriate to participate in the selected observers.

2.3. Data management

(1) Establishment of database: 213 clinical case observation tables of acupuncture and moxibustion collected in this study are paper materials of acupuncture and moxibustion clinical treatment recorded in the form of text and pictures in natural language. Excel is used to input and build the database of clinical case observation data.

(2) Quality control and optimization: After inputting the basic information, diagnostic information and treatment information of patients and verifying their effectiveness, the clinical researchers of acupuncture and moxibustion shall review them, and the acupoint names and other information in the treatment information shall be standardized.

(3) Data management and statistical analysis: Import the data in Excel into the statistical software SPSS statistics 19 and SPSS modeler 18.0, use SPSS statistics 19 for descriptive analysis, and use SPSS modeler 18.0 for association rule analysis. The most classic Apriori algorithm in the association rules is used to analyze the acupoints in the treatment information, and the acupoint strong association rules with special pairing relationship are found from the frequent item set. After repeated adjustment, the minimum support and minimum confidence in the association rules are set to 10% and 80%. The obtained strong association rules are the compatibility law of filiform needle acupuncture in the treatment of acupoints with arthralgia.

3. RESULTS

3.1. Analysis of acupoint frequency

There are 69 acupoints for treating Xiang Bi disease with filiform acupuncture, and 19 acupoints with a frequency greater than 10 times. Please refer to Table 1.

3.2. Acupoint compatibility analysis

Using SPSS modeler 18.0, set the lower limit of strong link 25 and the upper limit of weak link 15, and draw the association network diagram between 19 acupoints. The thick connection between the two acupoints indicates that the higher the degree of association. The acupoint association network is shown in Figure 1. It can be found from the figure that in the treatment of Xiang Bi disease, filiform acupuncture points are highly related to "Jingjiaji-

Table 1. Statistical table of acupoint frequency of filiform acupuncture in the treatment of Xiang Bi disease

acupoint	frequency	acupoint	frequency	acupoint	frequency
Jingjiaji	175	Waiguan	28	Sanyinjiao	14
Fengchi	66	Dazhui	27	Xuehai	13
Jianjing	52	Baihui	24	Taichong	12
Houx	49	Chonggu	22	Ashixue	10

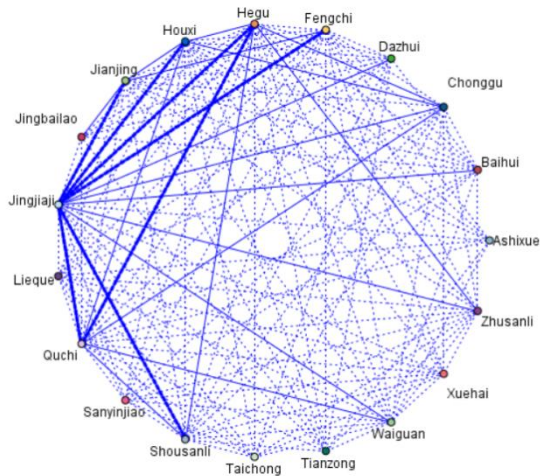| Hegu	44	Jingbailao	19	Lieque	10
Quchi	44	Zhusanli	18		
Shousanl	28	Tianzong	16		

Figure 1 Network diagram of acupoint compatibility

Jianjing", "Jingjiaji- Fengchi", "Jingjiaji- Quchi", "Jingjiaji- Shousanli", " Jingjiaji-Houxi", " Jingjiaji-Hegu" and "Hegu Fengchi".

The support and confidence were used as the correlation evaluation indexes of acupoint compatibility of filiform acupuncture in the treatment of Xiang Bi disease. Support indicates the probability that the previous and subsequent items appear at the same time in all events, and confidence indicates the probability that the latter item appears under the condition that the previous item appears. For example, in compatibility, 19 acupoints with acupoint frequency greater than 10 times were analyzed for association rules in thesetting mode of support greater than 10% and confidence greater than 80%, and a total of 17 association rules were obtained. The association rules are shown in Table 2. There are only 5 association rules with support greater than 20% and confidence greater than 80%. When the wind pool appears, the probability of cervical clip ridge is 33.33%, and the acupuncture prescriptions supporting the association rule account for 27.27%.

4. ANALYSIS

Cervical spondylosis in modern medicine is divided into six types [5], of which cervical type and nerve root type belong to the category of "Xiang Bi" in traditional Chinese medicine according to their clinical manifestations. The clinical manifestations are neck shoulder back pain and upper limb radiation pain. Its general pathogenesis is based on deficiency and marked by reality, which is based on deficiency of liver and kidney and wind cold dampness [4]. Evil Qi takes advantage of deficiency, resulting in blood stasis of meridians and poor operation of Qi and blood. Therefore, in acupuncture treatment, it is mainly to tonify the liver and kidney, dredge meridians and collaterals, promote blood circulation and relieve pain [6]. In this study, the data showed that the main symptoms of patients were neck, shoulder and arm pain, numbness and weakness of upper limbs, etc; The main syndromes are qi stagnation and blood stasis syndrome, liver and kidney deficiency syndrome, wind cold obstruction syndrome, etc; There are 69 commonly used acupoints, of which 19 are used more frequently greater than or equal to 10 times. According to the analysis of association rules, the main acupoint compatibility laws of acupuncture in the treatment of Xiang Bi disease are as follows.

4.1. Local acupoint allocation

Local acupoint matching is a common acupoint matching method for limb meridian diseases [7]. It uses the treatment law of "where the acupoints are and where the main treatment is" and selects the acupoints where the sick part is or adjacent parts for compatibility. It is a comprehensive application of "taking pain as acupoints" in Lingshu · Jingjin, and conforms to the treatment principle of "disease lies in tendons, regulating tendons; disease lies in bones, regulating bones" in Su Wen • Tiaojing Lun. Theresults of association rules show that the Cervical Jiaji Fengchi, Cervical Jiaji Chonggu and CervicalJiaji

Table 2. Association rules of acupoint compatibility of filiform acupuncture in the treatment of Xiang Bi disease

Acupoint	Support percentage %	Confidence percentage %	Rule support percentage %
Jingjiaji and Fengchi	33.33	81.82	27.27
Jingjiaji and Jianjing	26.26	86.54	22.73
Jingjiaji and Houxi	24.75	87.76	21.72
Jingjiaji and Quchi	22.22	90.91	20.20
Jingjiaji and Hegu	22.22	90.91	20.20
Jingjiaji and Quchi and Hegu	14.65	96.55	14.14
Jingjiaji and Waiguan	14.14	82.14	11.62
Jingjiaji and Shousanli	14.14	100.00	14.14
Jingjiaji and Baihui	12.12	87.50	10.61
Hegu and Chonggu	11.11	81.82	9.09
Jingjiaji and Chonggu	11.11	100.00	11.11
Hegu and Chonggu and Jingjiaji	11.11	81.82	9.09
Jingjiaji and Houxi and Hegu	10.61	95.24	10.10
Hegu and Shousanli and Quchi	10.10	85.00	8.59
Jingjiaji and Shousanli and Quchi	10.10	100.00	10.10
Jingjiaji and Jianjing and Houxi	10.10	85.00	8.59
Hegu and Shousanli and Quchi and Jingjiaji	10.10	85.00	8.59

Jianjingbelong to local acupoints. Due to wind cold anddampness evil blocking the meridians, qi stagnation and blood stasis, "obstruction leads to pain", so local acupoints on the neck are mostly selected to relax tendons and dredge collaterals, promote blood circulation and relieve pain. Jingjiaji point is located next to the governor vessel and the disease location. Acupuncture of Jingjiaji can dredge the governor vessel and the meridians and Qi of the sun meridian, harmonize Yin and Yang, dredge collaterals and relieve pain, make the blood and Qi of the neck unobstructed, coordinate the viscera, and nourish the brain marrow; Fengchi point is the intersection point of Yangqiao pulse, Yangwei pulse and hand Shaoyang three jiao meridians. Acupuncture at Fengchi point can stimulate the Qi of the three meridians and dredge the neck joint. Chonggu is a strange acupoint outside the meridian, which is located in the middle of the back of the neck. It can promote qi and blood circulation and regulate meridians and tendons; Jianjing point belongs to the gallbladder meridian of foot Shaoyang. It is the intersection point of hand and foot Shaoyang, Foot Yangming and Yang Wei pulse. It has the function of relaxing muscles and activating collaterals. The combination of various acupoints can direct the disease, and play the functions of dredging and regulating qi and blood channels and collaterals in the neck, promoting qi and relieving pain.

4.2. Far and near matching points

Far and near compatibility refers to the compatibility of local acupoint selection and far acupoint selection. In Xiang Bi disease, the near part specifically refers to the location of the lesion - head and neck, and the far part

refs to the upper limb where the meridians pass. The combination of the two can regulate qi and blood, relax muscles and activate collaterals. Distal acupoint selection refers to the selection of acupoints far away from the disease and syndrome, which reflects the treatment law of "meridians pass by, indications reach". According to the chapter of Lingshu • the beginning and end: "the disease is taken from the top, the disease is taken from the bottom, the disease is taken from the head, and the disease is taken from the foot, and the disease is taken from the hamstring." Xiang Bi disease is related to the Du meridian, hand and foot sun, Yangming and Shaoyang meridians. The remote acupoints are mainly selected along the meridians. If the disease is in the hand Yangming meridians, the "hand Sanli", "Hegu", "Quchi" and "Houxi" are selected for the disease in Shaoyang. The results of association rules show that: Jingjiaji Houxi, Jingjiaji Quchi, Jingjiaji shousanli Quchi, and Jingjiaji Waiguan all reflect the idea of matching points far and near. "Bian que Shen Ying acupuncture and moxibustion jade dragon Sutra • acupuncture Fu" stabs Houxi with strong points on the head. Houxi is the intersection point of eight veins, which connects the governor's pulse and matches the Shen pulse. It belongs to the hand sun Sutra. "Lingshu • meridians": "the pulse of the hand sun in the small intestine... Comes out of the shoulder, goes around the shoulder blade and crosses the shoulder..." so Houxi point can dredge the blood and Qi in the neck and shoulder blade; Hegu, Quchi and shousanli are all points of the hand Yangming meridians. Lingshu • meridians: "the pulse of the hand Yangming of the large intestine... The upper shoulder is cheap before it comes out of the bone, and the upper part comes out of the meeting of the column bone". Lingshu • meridians "when the disease passes, it hurts and turns the tendon, the shoulder does not lift, and the neck cannot look left and right", so it can relax the muscles and bones, dredge the meridians and dredge the Qi and blood of the neck.

5. CONCLUSIONS

This study carried out the research on the clinical application of acupuncture and moxibustion by using the methods of TCM clinical data structure and knowledge association, and completed the standardization and structure of acupuncture and moxibustion clinical observation data through the design and application of acupuncture CRF; On this basis, referring to the clinical data standard of acupuncture and moxibustion, the original clinical data of acupuncture and moxibustion were attribute reconstructed and knowledge coded, the digitization of clinical information of acupuncture and moxibustion was completed, and a new digital clinical observation database of acupuncture and moxibustion (CDF database) was created; The demonstration study of correlation analysis of 213 cases of acupuncture clinical

observation data was carried out according to the knowledge association rules. The whole research process was organized and implemented according to the standardized operation process (SOP) of the methodology, which verified the scientificity, rationality and operability of the methodology. It provides an innovative clinical research mode and technical method based on the concept of big data for acupuncture clinical research, and has broad application prospects.

Based on the analysis of the law of acupoint compatibility, local acupoints are often used in the clinical treatment of Xiang Bi disease. However, the data on acupoint compatibility optimization is not perfect, so it is necessary to strengthen the quality and integrity of clinical data collection, but ensuring the integrity of data will inevitably increase the burden of clinicians. In order to improve the data quality and put forward new requirements for data collection, it is necessary to adopt artificial intelligence (AI) technology to realize the intelligent collection of clinical data, better solve the contradiction between data integrity and clinical practice. At the same time, the amount of calculation based on the association combination of TCM clinical knowledge is huge. It is necessary to design the TCM clinical data knowledge association analysis software system based on acupuncture CDF database, and uses the computer to complete this huge and complex knowledge association calculation, so as to better serve the clinic.

ACKNOWLEDGMENTS

REFERENCES

[1] Zhang Wei, Li Jinxiang, Lou Bidan, ye Yong, Shi Wenying, Li Hongliang, Yu Zhaoan, long Kangsheng, Peng ran, Tang Jing, Xiong Yanzhen. "Clinical practice guide of rehabilitation of traditional Chinese medicine • Xiang Bi (cervical spondylosis)"[J]. Journal of rehabilitation, vol. 30, pp.337-342, May 2020.

[2] Chen Jianhui. Treatment of 60 cases of cervical spondylotic radiculopathy with three cervical needles combined with meridian differentiation and syndrome differentiation [J]. China acupuncture and moxibustion, vol. 31, pp. 927-9282, October2011.

[3] Li Jiexin. 60 cases of cervical spondylotic radiculopathy treated mainly by acupuncture at

Cervical Jiaji point [J]. Hebei Traditional Chinese medicine, vol. 34, pp. 1681-1682, November2012.

[4] Tang Xiaoyan. Experience of treating cervical spondylotic radiculopathy with traditional Chinese medicine [J]. Inner Mongolia traditional Chinese medicine, vol.39, pp.151-152, October 2020.

[5] Gao Shunxing. Historical evolution of definition and classification of cervical spondylosis in China [J]. Traditional Chinese medicine bone setting, vol.32, pp. 44-47, April 2020.

[6]Chen Lin, Zhao Xuetian. Clinical research progress of acupuncture and moxibustion in the treatment of cervical spondylotic radiculopathy in recent five years [J]. China Medical Guide, vol.22, pp. 768-771, November 2020.

[7] Wang Hui, Zhao shumeng, Lin Jingyi, Chen Bo, Chen Zelin, Guo Yi. Analysis of acupoint compatibility law in Da Cheng of acupuncture and moxibustion [J]. Liaoning Journal of traditional Chinese medicine, vol. 47, pp. 167-170, April 2020.