

Exploring the Acupuncture Point Pattern of Acupuncture for Diabetic Retinopathy Based on Data Mining

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Abstract: Objectives using data mining methods to explore the pattern of acupuncture points in the treatment of diabetic retinopathy. Methods Of searching the entire literature since the establishment of China Knowledge Network database, Wanfang database, China Biomedical Literature database, and PubMed database until September 1, 2022, the literature was screened according to the proposed search strategy, as well as inclusion and exclusion criteria, 52 papers were selected and Excel, SPSS 23.0 and SPSS modeler were used to establish The acupuncture prescription database was organized, summarized as well as analyzed for acupuncture point treatment, frequency, meridian, site, specific points, association rules, and systematic clustering. Results 52 articles were included, involving 59 acupoints, 14 meridians, and 8 extraordinary points; the main treatment methods were acupuncture, acupoint application, electroacupuncture, and thermosensitive moxibustion, etc.; The adjuvant therapy has traditional Chinese medicine and western medicine intervention; The acupoints that were taken ≥ 15 times were, in order, Jingming, Cuanzhu, Sanyinjiao, Taiyang, Zusanli, Tongziliao, Fengchi, Taichong, Chengqi, Sizhukong, Hegu, Shenshu, Qiuhou, and Ganshu; The acupuncture meridians are mainly the Bladder Channel of Foot-Taiyang, Gallbladder Channel of Foot-Shaoyang, Stomach Channel of Foot-Yangming, Spleen Channel of Foot-Taiyin and Large Intestine Channel of Hand-Yangmin, which are mainly located in the head and neck region, and the specific points are mainly the Crossing Point, the Yuan-Dource Points, Right Confluent Points, He-Sea Points and the Back-Shu Points. Cluster analysis of acupoints were: Jingming-Cuanzhu, Jingming-Taiyang, Sanyinjiao-Zusanli, Jingming-Zusanli, Jingming-Tongziliao; Cluster analysis obtained 3 clusters. Conclusion Acupuncture points for the treatment of diabetic retinopathy are mainly selected from the head and neck and taken around the eyes, with the Three Foot Yang Channels being the most common. Special points are mainly the Crossing Point, the Yuan-Dource Points, He-Sea Points.

Diabetic Retinopathy [1] (DR) is one of the common complications of diabetes and is the main cause of vision loss and blindness in patients with diabetes. Research shows [2] that the number of diabetic patients is expected to reach 693 million in 2045. With the increase of the number of diabetic patients and the extension of life span, the number of DR Patients will continue to expand.

With the continuous progress of science and technology, the means of treating DR Are gradually enriched [3], including intravitreal drug preparation, laser photocoagulation, and vitreous surgery, etc., but the effect is not satisfactory and there are certain side effects. With the development of traditional Chinese medicine, the application of traditional Chinese medicine in DR Has received more attention. Previous studies have found [4] that acupuncture combined with traditional Chinese medicine treatment can inhibit VEGF and IDF-1 in the serum of patients with DR To prevent nerve damage and improve the vision of patients with DR. Opinions vary on the selection of points for DR Treatment. This study, by analyzing many literatures, summarizes and concludes the selection rules of acupuncture for DR, in order to provide a certain references for clinical practice.

1. Data and Methods

1.1. Source of Literature

Select China national knowledge infrastructure, CNKI, Wanfang Database, Chinese BioMedical Literature Database, CBM, Pub Med database for the establishment of the literature on acupuncture in the treatment of diabetic retinopathy to September 1, 2022.

1.2. Literature Search Strategy

(1) The Chinese literature database uses "Diabetic Retinopathy", "hypochondriasis", "diabetic retinopathy", "acupuncture", "acupuncture therapy", "acupuncture therapy", "acupoint application", "acupoint catvot", "needle" and "electroacupuncture" as key words for advanced retrieval. (2) The literatures in foreign languages (Diabetic Retinopathy OR Diabetic Retinopathy OR (retinal diseases AND diabetes complications)) AND (acupuncture*) to conduct a relevant search for search terms.

1.3. Literature Inclusion Criteria

(1) Take acupuncture and moxibustion as an intervention measure, and have a clear prescription of acupoints; (2) Non-proliferative DR Patients were selected as research objects; (3) This is a randomized controlled clinical trial with recognized diagnostic and treatment standards.

1.4. Document Exclusion Criteria

(1) Review, Mate analysis, case report, theoretical experience, etc.; (2) The selected acupoints are ashi acupoints and auricular acupoints that cannot be accurately located; (3) Acupuncture was not the main intervention measure; (4) Repeated literature;

1.5. Data Processing and Analysis

According to the proposed search strategy, the literature was searched in CNKI, Wanfang, CBM, and PubMed databases, the repeated literature was eliminated, the literature was preliminatively screened by observing the title and abstract of the literature, the full text of 52 literatures meeting the inclusion criteria was downloaded, and the literature was intensively read. Research data from the literature, including acupuncture and moxibustion treatment methods, names of acupoints, meridian transformation, attributes, positions, etc., were extracted to establish a database. SPSS25.0, SPSS Modeler 18.0, and Excel were used to analyze the data.

2. Results

2.1. Point Selection Analysis of Literature

A total of 548 literatures were retrieved through the literature retrieval strategy, and 52 literatures were included according to the inclusion criteria. A total of 59 acupoints were found, with a total frequency of 476 times, involving 14 meridians and collaterals, as well as many odd acupoints.

2.2. Analysis of Treatment Methods

Fifty-two literatures were included according to the criteria, among which acupuncture was the main treatment method, and traditional Chinese medicine intervention was more common in combination treatment, among which acupuncture plus traditional Chinese medicine was the most common (46.15%), followed by acupuncture alone (21.15%) and acupuncture plus Western medicine intervention (17.30%). (See Table 1 for details)

Table 1: Methods of acupuncture for DR

Treatment methods	Coordinate treatment	Number of literatures (articles)	Percentage (%)
Acupuncture	None	11	21.15
	Chinese medicine	24	46.15
	Western medicine	9	17.30
	Laser therapy	2	3.84
Acupoint application	Chinese medicine	2	3.84
	Western medicine	1	1.92
Electric acupuncture	None	1	1.92
Heat sensitive moxibustion	None	1	1.92
	Acupuncture	1	1.92

2.3. Analysis of Acupoint Selection Frequency

Table 2: Frequency analysis of acupuncture points

Acupuncture points	Frequency (times)	Percentage (%)	Acupuncture points	Frequency (times)	Percentage (%)	Acupuncture points	Frequency (times)	Percentage (%)
QingMing	42	8.82	YangBai	6	1.26	JianMing	1	0.21
CuanZhu	32	6.72	Guanyuan	6	1.26	YiMing	1	0.21
Sanyinjiao	31	6.51	QuChi	6	1.26	YongQuan	1	0.21
Taiyang	28	5.88	YuYao	5	1.05	NeiGuan	1	0.21
ZuSanli	28	5.88	ZhongWan	4	0.84	ShenQue	1	0.21
TongZiliao	24	5.04	YangLingQuan	3	0.63	LieQue	1	0.21
Fengchi	23	4.83	QiHai	3	0.63	TianShu	1	0.21
Taichong	22	4.62	WeiWanXiaShu	3	0.63	Shuifen	1	0.21
ChengQi	21	4.41	FeiShu	2	0.42	ZhaiHai	1	0.21
SiZhukong	20	4.20	ShangXing	2	0.42	BaiHui	1	0.21
HeGu	20	4.20	MingMen	2	0.42	WeiZhong	1	0.21
ShenShu	16	3.36	WaiGuan	2	0.42	WaiLing	1	0.21
QiuHou	16	3.36	DaZhui	2	0.42	FeiYang	1	0.21
GanShu	15	3.15	ShiQu	2	0.42	DaZhong	1	0.21
XueHai	14	2.94	LiGou	2	0.42	TongLi	1	0.21
TaiXi	11	2.31	DiJi	2	0.42	ZhiZheng	1	0.21
Pishu	10	2.10	GeShu	1	0.21	ChangQiang	1	0.21
SiBaI	10	2.10	XiaWan	1	0.21			
GuangMing	10	2.10	YinTang	1	0.21			
YinLingQuan	9	1.89	FengFu	1	0.21			

A total of 59 acupoints were selected in the literature, and they were used for 476 times, among which 14 acupoints with a frequency of ≥ 15 times were selected. The following are Qingming (8.82%), Zhuzhu (6.72%), Sanyinjiao (6.51%), Taiyang (5.88%), Zusanli (5.88%), Tongzi Liao (5.04%), Fengchi (4.83%), Taichong (4.62%), Chengmei (4.41%), Sizhukong (4.20%), Hegu (4.20%), Shenshu (4.20%) 3.36%), after the ball (3.36%) and Ganshu (3.15%). (See Table 2 for details)

2.4. Acupoint Meridian

A total of 59 DR Acupoints are treated by acupuncture, involving 14 points of meridian conversion and many odd points outside the meridian. The meridians with frequency ≥ 25 times are as follows: Foot Sun bladder meridian (25.21%), foot Shaoyang gallbladder meridian (13.87%), foot Yangming stomach meridian (13.03%), Foot Taiyin spleen meridian (11.97%), hand Yangming large intestine meridian (5.46%). The results showed that in the selection of acupoints in the treatment of DR, the application times of the bladder meridian of the foot sun were the most, which was significantly higher than other meridians.

2.5. Point Selection Site

According to the selected literature, it was found that acupuncture treatment DR Acupoint selection involved 5 parts. After sorting and analyzing the number of selected parts in the literature, it was found that the head and neck (50%) were the most common, 238 times in total. The lower extremity (28.78%), 137 times; Lower back (10.52%), 50 times; Upper limb (6.72%), 19 times; Chest and abdomen (3.99%), 19 times. (See Figure 1 for details)

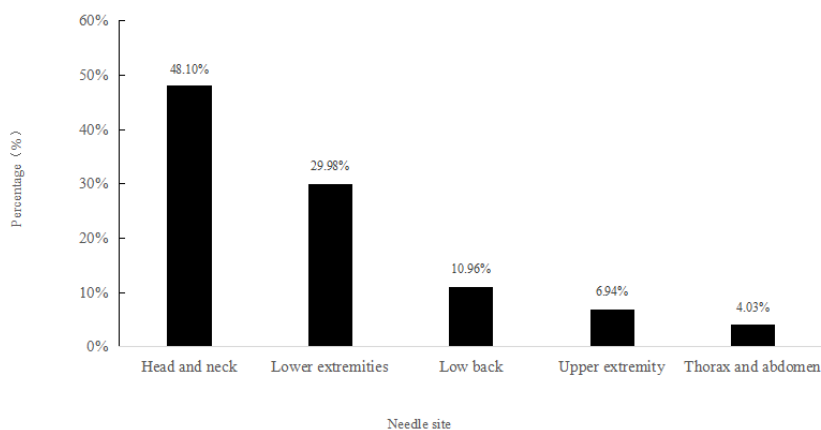


Figure 1: Analysis of acupoint selection.

2.6. Specific Point Analysis

Among the 59 acupoints selected in the literature, 41 specific acupoints and 18 non-specific acupoints were included. Among the specific acupoints, the intersection acupoints had the highest frequency (28.71%), appearing 120 times in total. The following points were Yuan point (12.70%), Bamai junction point (11.24%), He point (11.24%), Bei Yu point (10.29%), etc. (Percentage of selected acupoints = frequency of selected acupoints/total occurrence frequency of selected acupoints) (see Figure 2 for details)

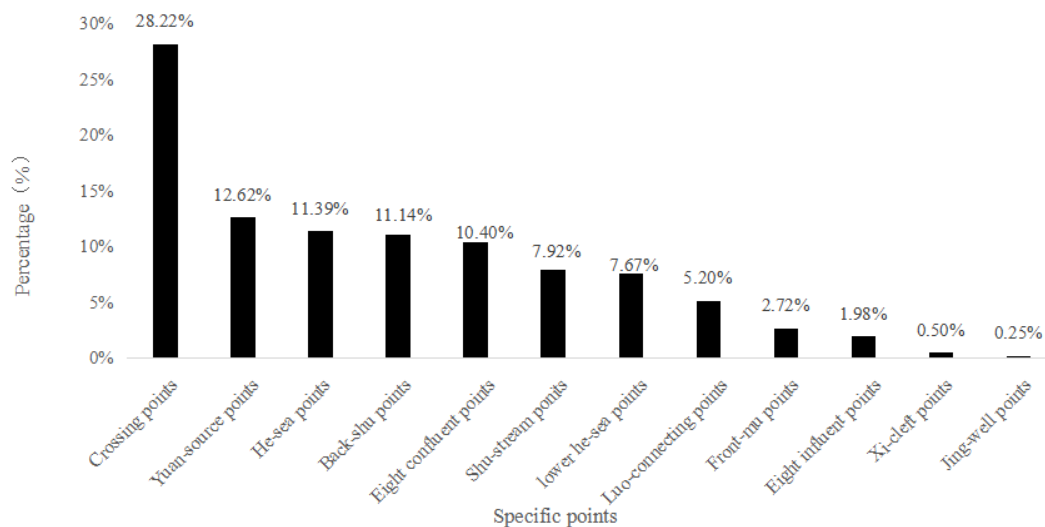


Figure 2: Analysis of specific acupoints.

2.7. Cluster Analysis

The statistical software SPSS23.0 was used to select systematic clustering in the analysis and classification, and the systematic clustering analysis was carried out on the acupoints with frequency ≥ 10 times. The maximum clustering was set as 10, and the minimum clustering was set as 5. The clustering method adopted the association between groups, Pearson correlation was selected in the interval, and the pedigree chart was made. The analysis results showed that the acupoints in the treatment of DR Could be roughly divided into three categories: "Shenshu - Ganshu - Pishu - Zhuzhu - silk bamboo - sun - Chengshu - eye, Liao Zi, Hegu - four white", "Taichong - Sea of blood - Sanyinjiao - Zusanli - Taixi", "wind pool - bright - bright eyes - after the ball". (See Figure 3 for details)

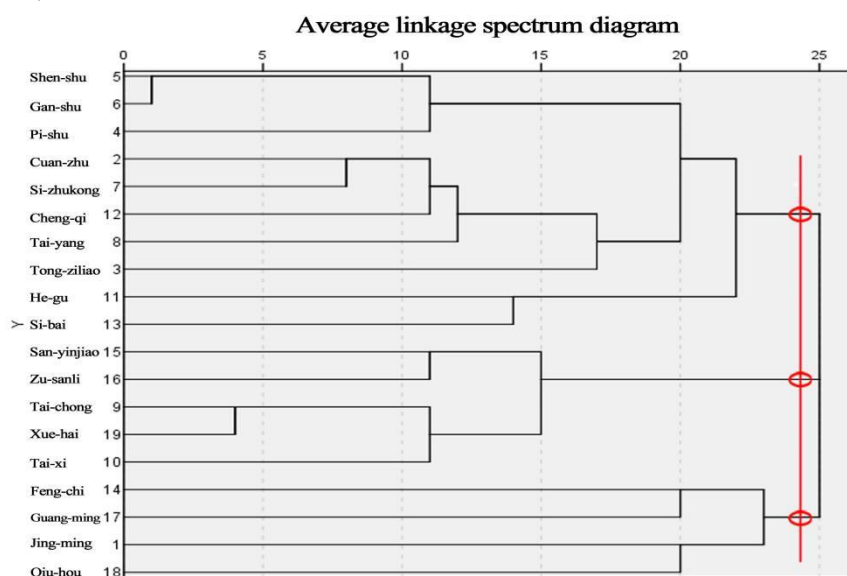


Figure 3: Cluster analysis of acupoint system.

3. Discussion

Diabetic retinopathy has long been considered a microvascular disease that can affect vision and even cause blindness in severe cases. DR Has been known for a long time in traditional Chinese medicine, and there are records of "sparrow eye", "cataract" and "blindness" in many ancient books [5]. Although there is no disease name of "diabetic retinopathy", Dr Can be classified into the category of "thirst eye disease" and "thirst cataract" according to its pathological manifestations [6]. Many doctors have different understandings of DR. In the Secret Recipe for Syndrome and Prescription [7], it is mentioned that "after three eliminations for a long time, the blood is deficient, or there is no sight." It is believed that the long time of quenching thirst hurts the Jingxue, resulting in the Jingxue can not go to the Rong Muqiao, resulting in blindness. In the diagnosis and treatment guide of DR, Chinese Medical Association [8] put forward that the pathogenesis of DR Is the gradual process of deficiency, stasis, and phlegm, which is caused by prolonged quenching of thirst, injury to spleen and stomach, deficiency of temper, deficiency of liver and kidney, turidity and stagnation of phlegm, and obstruction of veins. In the Secret Collection of Lanshi [9], "Spleen deficiency means that the five Zang organs and the essence are all dislocated and cannot be identified in the eyes." It is believed that spleen deficiency causes the immobility of fine matter and the inability to nourish the eyes, resulting in blindness. The etiology and pathogenesis are usually caused by weakness of temper, deficiency of Qi in the liver and kidney, turbidity of phlegm and blockage of phlegm, or deficiency of spleen and blood in Rong Muqiao. The disease location is mainly in liver, spleen, and kidney. Previous studies have confirmed the positive effect of acupuncture on DR Treatment [10-11].

A total of 59 acupoints were included in this study, with Jingming, Zhuzhu, Sanyinjiao, Taiyang, Zusanli, and other acupoints being the most common. Among them, Qingming point appears the most frequently, which belongs to the foot Sun bladder meridian, located in the head and neck, and is the intersection point of the hand Sun small intestine meridian, foot Sun bladder meridian, foot Yangming stomach meridian, Yin Qiao and Yang Qiao five veins. In Lingshu [12], "The essence of the Five Zang and six Fu organs should be injected into the eye, and the essence of the eye", "eye" and "essence" have the meaning of the essence of the qi [13], so it can be considered that the essence of the Five Zang and six fu organs should be injected through this point, and acupuncture of the eye can promote the essence of the Five Zang and six fu organs to reach the eye and nourish the eye. Zhuzhu is a full sun of the bladder meridian, can release the gas of the bladder meridian, and play a role in regulating the qi machine and harmonizing Qi and blood. Sanyinjiao belongs to the foot Taiyin spleen meridian, "acupuncture and moxibustion Dacheng" in the cloud: "the main spleen and stomach weak... Do not think of diet "with spleen Qi, Qi and blood, Zusanli return to the foot Yangming stomach meridian, the stomach meridian of the combined point, under the combined point, its performance in regulating the gastrointestinal function is outstanding, has the function of regulating the viscera, lifting the qi machine, Sanyinjiao and Zusanli combines the two sides of the meridian with the acupoint method, cooperate with each other and play a total of focal, clear and turbidized effect.

To the side with foot bladder, the meridian of yangming foot, shaoyang bile, feet appear the most frequency, find an alternative head and neck and back side of the small gallbladder meridian find is given priority to head and neck, conform to the principle of "and" by the meridians, attending. The specific points are mainly rendezvous points and original points. Rendezvous points are many places of meridian rendezvous, which can exchange pulse and Qi and treat various meridian diseases. The original point is the place where the original qi of the viscera goes through and stays. In "Lingshu", the cloud says, "The Five Zang organs have disease, and the twelve original points should be out of the twelve original points." The twelve original points are the concentrated parts of

the essence Qi. The acupoint selection around the eyes reflects the proximal treatment effect, and the original acupoint reflects the distal treatment effect on the limbs.

According to the association rule analysis, the compatibility of acupoints with support degree $\geq 45\%$, confidence degree $\geq 80\%$ and gain ≥ 1 are: Qingming - Zhuzhu, Qingming - Sun, Sanyinjiao - Zusanli, Qingming - Zusanli. Mingming is compatible with saving bamboo, which can adjust Qi and blood and nourish eyes. Bright eyes and the sun which can dredge the meridians, clear the liver, and bright eye effect; Sanyin, Jiao and Zusanli are used to match the surface and surface, and play the purpose of clearing and reducing turbidity. Cluster analysis results showed that there were three clusters, ① "Shenshu - Ganshu - Pishu - Zhuzhu - silzhu - sun - Chengshu - eyes, eyes and kidneys, Hegu - four white", most of which were selected points around the eyes, reflecting the principle of "the location of the acupoints, the indications". Ganshu, Pishu, and Shenshu were back Shu points, which were the places where the qi of the viscera gathered for the treatment of viscera lesions; (2) "Taichong - Blood Sea - Sanyinjiao - Zusanli - Taixi", in which Taichong is the liver Jingyuan point and Taixi is the kidney Jingyuan point, playing the effect of Gubenpeiyuan, liver and kidney and tonic; The sea of blood is the sea of twelve meridians, which belongs to the spleen meridian of foot Taiyin, which can turn blood into Qi and transport blood; Liver opening Qiao in the eye, blood and can see, so you can choose blood sea and Zusanli to adjust the liver blood; (3) "Wind pool - bright - bright - after the ball", wind pool for the hands and feet Shaoyang, Yang Wei meeting, belongs to the foot Shaoyang gallbladder, and liver meridian surface; Guangming belongs to the gallbladder meridian, which is the acupoint of the gallbladder meridian. It has the function of contacting the gallbladder meridian through Qi and blood. The acupoints around the eyes reflect the "acupoints on the acupoints and indications".

To sum up, the causes of DR Are complicated, and the pathogenesis is mainly caused by weakness of temper, deficiency of Qi in the liver and kidney, turbidity of phlegm, and stasis, or inability of spleen and blood to reach the Rong Muqiao. The disease locations are mainly in the liver, spleen, and kidney. The acupoints selected for the DR Acupoints are mainly on the head and neck and around the eyes, and the Zusanyang Meridian is common. Through data mining technology, the acupoints in the literature were sorted out and analyzed in order to provide new ideas and insights for clinical treatment.

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