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CONTENTS

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Preparation and Process Optimization of Eucommia Gutta percha Based Shape Memory Materials

XIONG Dawei [1], YOU Yuan [1*]

School of Medicine, Wuhan University of Biological Engineering, Wuhan 430415, China

***Corresponding Author:** YOU Yuan*

Abstract: The sulfur system of conventional unsaturated rubber can be used to vulcanize and cross-link Eucommia ulmoides gum (EUG) moderately and destroy its partial crystallization. By adjusting the ratio of crystallinity and cross-linking degree, EUG can be made into thermotropic shape memory materials which respond to different temperatures, and the optimal formula was selected by orthogonal design. The EUG-based shape memory materials were prepared with this formula have a thermal stimulation memory execution temperature close to the normal body temperature and good shape recovery capability, which will be expected to be used as a pressure-sensitive adhesive material for transdermal drug delivery systems (TDDS) under human physiological conditions.

Keywords: *eucommia ulmoides gum; shape memory material; process optimization*

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Introduction

Thermotropic shape memory polymer material is a kind of functional materials that can respond to temperature changes and adjust itself to deform, which has a two-phase structure, namely a stationary phase and a reversible phase [1]. When it is heated to a certain temperature, an external force is applied to deform it, and it is cooled rapidly in the deformed state to freeze the stress; When it is heated above a certain temperature again, the stress of the material will be released, which will make the material automatically return to its original state. EUG is a kind of natural rubber derived from the leaves, fruits, barks and roots of Eucommia ulmoides Oliver, and its yield is abundant. Although it has the same chemical composition $(C_5H_8)_n$ as ordinary natural rubber, it is trans-polyisoprene structure, which has unique "rubber-plastic duality" [2], and has plasticity and high elasticity, and its melting point is about 60℃. It has been successfully applied to medical gypsum substitute, medical orthopedic material, drug sustained-release material [3].

2 Experimental Methods

2.1 Materials

EUG (＞94%) was purchased from Lueyang Jiamu Eucommia ulmoides industry Co., Ltd., Shaanxi Province, China. Zinc carbonate and talc were purchased from Tianjin Recovery Fine Chemical Research Institute, Tianjin, China. Sulfur and titanium dioxide were purchased from Zhejiang Yinuo Biotechnology Co., Ltd., Zhejiang Province, China. Zinc diethyldithiocarbamate (ZDC) and N-cyclohexylbenzothiazole-2-sulphenamide (CZ) were purchased from Wuhan Lanabai Medicine Chemical Co., Ltd., Hubei Province, China.

2.2 Formula

Basic formula: 1g gutta percha; Talcum powder 0.15g; 0.02 g zinc carbonate; 0.005g accelerator; 0.02 g sulfur; Titanium dioxide 0.15g.

2.3 Preparation process

Mixing process: at about 80 ℃, add EUG and mix for about 5min. After the rubber material is completely softened, add talcum powder, antioxidant (titanium dioxide), accelerator (CZ, ZDC), zinc carbonate and other auxiliary materials in turn, then add sulfur. After mixing, vulcanize at 150 ℃ for 30min [4].

2.4 Measurement of shape recovery rate of the materials

After marking a marking line with a pitch of L_0 on the sample, which was fixed between stretching jigs, raised the temperature to 60 ℃ in a uniform temperature field, kept the temperature constant for 5 min, and then the sample was stretched along the direction of gauge distance by L_a, kept the external stretching force to cool quickly at room temperature, and then the deformation was fixed, removed the external force, measured the distance L_b between the two marking lines, and put into a uniform temperature field with the temperature of 60 ℃. At this time, the measured distance between the two lines was Lc, and the shape recovery rate (R_r) was calculated using [5-6]:

$$R_r = (L_c-L_0)/(L_b-L_0) \times 100\% \quad (1)$$

2.5 Measurement of thermal stimulation memory execution temperature of the materials

The sample was cut into small strips with a length of

30 cm and a width of 5 mm, and stretched to the maximum yield length in a water bath at about 70 ℃, and then the sample was quickly cooled while maintaining the external force, and the deformation was fixed, put into a room temperature water bath, hanged 1 g weight, and a heating rate of 1 ℃/min. The retraction temperature of the sample was observed, which was measured three times for each sample, and the average value was the thermal stimulation memory execution temperature of the sample.

3 Results and Discussion

3.1 Single factor experiment results and analysis

3.1.1 Effect of sulfur consumption on execution temperature of thermal stimulation memory of materials

Sulfur is added to the gutta percha to make linear gutta percha molecules cross-linked to form a network structure under heating, thus increasing the strength of gutta percha and improving its elasticity and solvent resistance [7]. It can be seen from the above experimental results that, with the increase of sulfur consumption, the proportion of - S-S-bond in the chain structure directly increases, making its cross-linking density increase, hindering the movement of the molecular chain segment and the crystallization ability. At the same time, the proportion of the amorphous region also increases significantly, leading to the decrease of crystallinity and the decrease of its thermal stimulation execution temperature (as shown in Figure 1a).

3.1.2 Effect of accelerator ratio on the execution temperature of thermal stimulation memory of materials

In order to ensure the safety of the operation in the curing stage and the scorching property of the rubber compound, and take into account the safety, non-toxic, melting point and other physical properties of the reagents used, CZ and zinc diethyldithiocarbamate (ZDC) are selected as the mixed accelerator. It can be seen from the above experimental results that when the amount of sulfur is constant and the total amount of accelerant is constant, the execution temperature of thermal stimulation memory of the material first increases and then decreases (as shown in Figure 1b) with the increase of the ratio of accelerant ZDC to CZ. When the ratio of accelerant is between 4:1-5:1, the execution temperature of thermal stimulation memory of the material is between 36-37 ℃, close to the normal body temperature, with good effect.

3.1.3 Effect of the amount of zinc carbonate on the execution temperature of thermal stimulation memory

In order to improve its shape stability and remove H2S gas generated during vulcanization, we added a certain amount of zinc carbonate, which can improve the thermal conductivity and vulcanization speed of the rubber compound. However, with the increase of the amount of zinc carbonate, the thermal stimulation memory execution temperature of the material does not change significantly (as shown in Figure 1c), which may be related to that zinc carbonate can increase the thermal conductivity of the compound and improve its thermal conductivity.

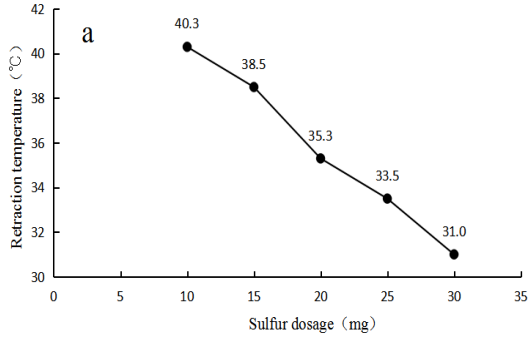
3.1.4 Effect of titanium dioxide dosage on the execution temperature of thermal stimulation memory

At the same time, we added titanium dioxide to improve the appearance of EUG based shape memory materials and prevent their oxidation. With the increase of the amount of titanium dioxide, the execution temperature of the thermal stimulation memory of the material increases slightly (as shown in Figure 1d).

According to the above experimental results, with the increase of the amount of titanium dioxide, the thermal stimulation memory execution temperature of the material increases slightly, but the reason why it affects the thermal stimulation execution temperature of TPI is unclear. It may be that its addition acts as a nucleating agent and promotes the formation of crystals, thereby increasing the thermal stimulation temperature of TPI shape memory materials [8].

3.1.5 Effect of talc dosage on the execution temperature of thermal stimulation memory

Of course, in order to ensure the complete vulcanization of EUG, we added talcum powder as the reinforcing filler. On the one hand, it reduces the crystallinity and mechanical strength of EUG, facilitating the mixing of unvulcanized rubber; On the other hand, it plays a reinforcing role in the rubber compound, improving its constant elongation strength and tensile strength. It is precisely because of these two aspects that the change of talcum powder dosage has no significant effect on the execution temperature of thermal stimulated memory of materials (as shown in Figure 1e).



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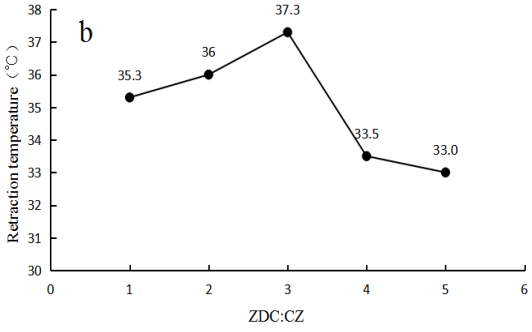

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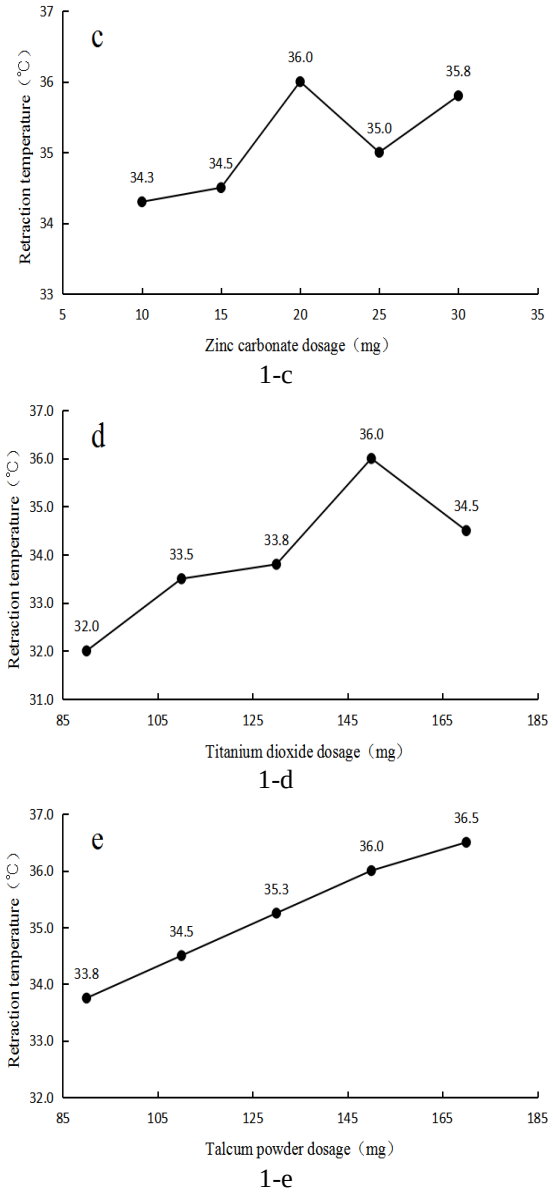

Figure 1 The effect single factor on the thermal stimulation memory execution temperature of the materials

3.2 Orthogonal experimental design and result analysis

On the basis of pre-test and single factor investigation, the prescription was optimized through orthogonal test design. The dosage of titanium dioxide and talcum powder was 150mg. Three factors and three levels orthogonal test were designed with the dosage of sulfur (A), accelerator ratio (B) and zinc carbonate (C) as three factors, The performance temperature of thermal stimulation memory of materials and the shape recovery rate of materials were used as evaluation indicators to screen the prescription process. The main factors and their levels were shown in Table 1, and the test results were shown in Table 2.

Table 1 Factors and levels

Levels	Factors		
	A Sulfur dosage (mg)	B Accelerator ratio	C Zinc carbonate dosage (mg)
1	18	4:1	15
2	20	5:1	20
3	22	6:1	25

Table 2 Orthogonal design test table for prescription screening of thermotropic shape memory polymer materials

Batch		Factors A	B	C	Response rate (%)	Retraction temperature (℃)
1		1	1	1	97.1	35.0
2		1	2	2	96.8	37.0
3		1	3	3	97.2	36.0
4		2	1	2	96.9	35.5
5		2	2	3	97.6	35.0
6		2	3	1	95.9	36.5
7		3	1	3	96.1	33.0
8		3	2	1	93.6	32.5
9		3	3	2	96.3	32.0
Response rate	K_1	97.03	96.70	95.53		
	K_2	96.80	96.00	96.67		
	K_3	95.33	96.47	96.97		
	R	1.70%	0.23%	1.44%		
Retraction temperature	K_1	36.00	34.50	34.67		
	K_2	35.67	34.83	34.83		
	K_3	32.50	34.83	34.67		
	R	3.50%	0.50%	0.17%		

For the shape memory polymer materials, the higher shape recovery rate was, the stronger its ability to keep shape would be, and the more beneficial it was to its application. Therefore, according to the analysis of orthogonal experimental results (Table 2), the best experimental scheme of combining the optimal levels of various factors was $A_1B_1C_3$.

As this material will be applied to human body as TDDS pressure sensitive adhesive material, the thermal stimulation memory execution temperature of the material should be close to the normal body temperature. And consequently, It could be seen from Table 2 that the best experimental scheme of combining the optimal levels of all factors was $A_1B_2C_2$ or $A_1B_3C_2$.

3.3 Determination of final experimental scheme

According to the orthogonal experimental optimization schemes $A_1B_1C_3$, $A_1B_2C_2$ and $A_1B_3C_2$, three batches of samples were prepared for each scheme, and

the thermal stimulation memory execution temperature and the shape recovery rate of the three batches of samples were measured respectively. The results were shown in Table 3.

Table 3 The results of thermal stimulation memory execution temperature and shape recovery rate of each batch of sample in each scheme

Samples	Retraction temperature (℃)			Response rate (%)		
	1	2	3	1	2	3
$A_1B_1C_3$	35.0	35.5	35.0	95.2	95.8	97.4
RSD (%)		0.83			1.18	
$A_1B_2C_2$	36.5	36.5	37.0	95.7	97.1	98.1
RSD (%)		0.79			1.24	
$A_1B_3C_2$	35.5	36.0	36.5	96.4	97.5	97.2
RSD (%)		1.39			0.59	

According to the above experimental results, the thermal stimulation memory execution temperature of the three batches of samples were prepared according to the prescription $A_1B_2C_2$ was closest to the normal body temperature, and the mean value of shape recovery rate was 97.0%, and the variance was less than 2%, which indicated the experiment reappeared well.

About the author: You Yuan (1985—), male, Han nationality, born in Zhongxiang, Hubei Province, master's degree candidate, lecturer title, research direction: Quality standard research of traditional Chinese medicine and ethnic medicine.

4 Conclusion

The technological formula optimized by orthogonal design was composed of sulfur 18 mg, accelerator ratio 5:1 (ZDC 4.17 mg, CZ 0.83 mg), zinc carbonate 20 mg, titanium dioxide 150 mg and talc 150 mg. The thermal stimulation memory execution temperature of the sample prepared with the optimal formula was about 37℃, and the shape recovery rate of the material was good, which improved the performance of EUG. Overall, the research on the preparation and process optimization of Eucommia ulmoides gum-based shape memory materials laid a foundation for further using it as pressure sensitive adhesive material for TDDS. However, the feasibility and safety of the materials should be further studied.

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Study on the Effect of Chewing Gum on Intestinal Preparation in Patients

LI Jing

Shanxi Province Fenyang Hospital of, Fenyang Shanxi 032200, China

***Corresponding Author:** LI Jing*

Abstract: Objective: the clinical expected effect of planned chewing gum during colonoscopy patients during bowel preparation. Methods: from March to May 2019, 68 inpatients in the gastroenterology department of Shanxi Province Fenyang Hospital who needed to undergo colonoscopy were selected and divided into the control group and the observation group according to the random number table method, with 34 cases in each group. The control group used traditional bowel preparation methods for bowel preparation, while the observation group chewed sugar-free chewing gum during the interval between taking and refreshing as required. The occurrence of adverse reactions during bowel preparation, medication compliance and bowel cleanliness were evaluated in the two groups of patients. Results: compared with the control group, the observation group had fewer adverse reactions such as nausea and vomiting, improved medication compliance, and improved the effect of bowel preparation. Conclusion: chewing gum planned for colonoscopy patients during bowel preparation can improve nausea, vomiting and other adverse reactions and medication compliance, improve the effect of bowel preparation, and provide a guarantee for the smooth progress of colonoscopy. Clinical effect Good and worth promoting.

Keywords: *colonoscopy; sham feeding; adverse reactions; intestinal cleanliness*

DOI: 10.33142/cmn.v1i1.7657

In recent years, with the high incidence of colorectal cancer, colonoscopy has gained important significance. Studies have shown that about 20% of unqualified bowel preparations are related to patients' inability to tolerate large doses of Hexing, and some patients even report that the bowel preparation process is more painful than undergoing colonoscopy. Poor bowel preparation reduces the success rate of colonoscopy. How to shorten the bowel preparation time, reduce the pain of patients during bowel preparation, and then improve the quality of bowel preparation cleaning for patients is a common concern of medical staff. In this study, chewing gum in a planned way during colonoscopy can stimulate the peristalsis of the gastrointestinal tract, shorten the time of bowel preparation, improve adverse reactions such as nausea and vomiting, and improve medication compliance, thereby improving the effect of bowel preparation. Ensure the smooth progress of the inspection.

1 Clinical Materials

1.1 General information

From April 2019 to September 2019, 68 in-patients in the digestive department of Shanxi Fenyang Hospital who met the standard and needed colonoscopy were selected and divided into two groups according to the random number table: 34 patients in the control group and 34 patients in the observation group. The control group consisted of 20 males and 14 females; The average age was 41.6 years old, ranging from 20 to 70 years old; Education level: 10 cases in primary school, 24 cases from technical secondary school to undergraduate; The traditional intestinal preparation method was used for intestinal preparation. The observation group consisted of 19 males and 15 females; The average age was 44.5 years old, ranging from 22 to 72 years old; Education level: 12 cases in primary school, 22 cases from technical secondary school to undergraduate; The observation group chewed sugarless gum during the interval between taking and relaxing as required. There was no significant difference between the two groups in terms of gender, age and educational level ($P>0.05$), which was comparable.

1.2 Inclusion criteria

Patients who plan to undergo colonoscopy in the endoscopy center of our hospital; Take compound polyethylene glycol electrolyte powder for bowel preparation; can chew gum independently; Aged 18-75 years old; voluntarily participated in this study and signed the informed consent.

1.3 Exclusion criteria

Mental illness, abnormal heart and lung function, history of abdominal surgery; Habitual constipation (long-term oral laxatives or topical laxatives); Those who cannot tolerate the required water during bowel preparation; Those who have abdominal discomfort, nausea, and vomiting before taking; Informed consent forms cannot be signed.

1.4 Materials

Compound polyethylene glycol electrolyte powder

(trade name: Heshuang, Shenzhen Wanhe Pharmaceutical Co., Ltd.), consisting of 5.68g anhydrous sodium sulfate, 1.46g sodium chloride, 0.74g potassium chloride, 1.68g sodium bicarbonate, and 60g polyethylene glycol 4000; Xylitol sugar free gum (Yida) 8 capsules; Colonoscopy.

2 Treatment Methods

Both groups of patients were guided by the same responsible nurse with specialized knowledge for bowel preparation, and explained the purpose, operation process, cost, possible complications of colonoscopy to the patients and their families, and obtained the understanding and cooperation of the patients and their families. and signed the informed consent.

2.1 Control group

Colonoscopy routine bowel preparation and guidance, that is, the day before the examination, eat a low-residue diet, and stop eating after 8:00 p.m. Start taking 2 bags of compound polyethylene glycol electrolyte powder at 10:00 on the day of the examination, each bag is dissolved in 1 000 mL of warm water (water temperature ＜25 ℃), a total of 2L. Take 250 mL every 15 minutes, and it takes 2 hours to drink it all [1].

2.2 Observation group

The method of taking is the same as the control group. The difference from the control group is that the research subjects chew a xylitol sugar-free chewing gum (Yida) at the interval after drinking 250 mL. The time for each person to finish drinking 250 mL is not uniform. There is no uniform rule on the chewing time of each tablet. A total of 8 chewing gums. During taking, the chewing condition of the chewing gum was confirmed by the nurse in charge.

3 Curative Effect Observation

3.1 Observation index

The first defecation time and the last defecation time were compared between the two groups; the adverse reactions and patient compliance were compared between the two groups; the bowel preparation quality was compared between the two groups.

3.2 Statistical methods

SPSS 17.0 statistical software was used to analyze the data, and the count data were represented as examples, and the X^2 test was used. $P<0.05$ means the difference is statistically significant.

3.3 Results

Table 1 shows the comparison results of adverse reactions, medication compliance and intestinal quality of colonoscopy patients between the two groups.

Table 1 Comparison of adverse reactions, medication compliance and bowel quality in colonoscopy patients between the two groups [cases (%)]

Group	Number of cases	Adverse reactions	Intolerance to medication	Intestinal quality (grade III -IV)
Observation group	34	1 (2.94) △	2 (5.88) △	3 (8.82) △
Control group	34	8 (23.53)	11 (32.35)	12 (35.29)

Note: Compared with the control group, △ $P<0.05$

4 Discussion

Electronic colonoscopy is an important means to diagnose and screen colon diseases, and its diagnostic accuracy and treatment safety largely depend on the quality of intestinal preparation [2]. Adequate intestinal preparation means that all polyps ＞ 5mm in the intestinal tract can be detected under endoscopy [3]. It is the basic condition to improve the speed of lens entry, so as to fully observe the colon mucosa, to accurately obtain living tissue samples, and successfully conduct endoscopic treatment, and to reduce the local infection after surgery [4]. Poor intestinal preparation will not only reduce the detection rate of adenoma, the success rate of cecal intubation, and the detection rate of polyps in colonoscopy, It will also significantly prolong the operation time, aggravate the pain of patients, increase adverse reactions, shorten the interval between colonoscopy again, and increase medical expenses [5]. The ideal bowel preparation method for colonoscopy [6] should have the following characteristics: ① It can empty the feces in the colon in a short time; ② No change of colon mucosa; ③ It will not cause discomfort to patients and has good compliance; ④ Do not cause water electrolyte disorder; ⑤ The price is moderate. There are many methods of bowel preparation before colonoscopy, and different preparation methods have different cleaning effects and adverse reactions. The adverse reaction of intestinal preparation will lead to poor compliance of patients, making them unable to prepare intestinal tract completely as required, or even giving up intestinal preparation. The research results of Zhang Yuanyuan et al. [7] also show that chewing gum can effectively reduce the occurrence of nausea, vomiting and other adverse reactions in patients taking medicine during colonoscopy.

Therefore, it is very important to choose a bowel preparation method with good cleaning effect, less adverse reactions and a wide range of applications. This article proves that chewing gum during intestinal preparation can reduce discomfort of patients, improve

medication compliance, and improve the quality of intestinal preparation. According to the Boston Bowel Preparation Rating Scale (BBPS) [8] (Grade I - Grade IV), the quality of intestinal preparation can reach Grade I - Grade II.

Some studies have shown that chewing gum can promote the recovery of gastrointestinal function in patients after abdominal surgery [9], and there is also evidence that chewing gum during capsule endoscopy can shorten the time of capsule passing through the stomach, and increase the proportion of capsule endoscopy reaching the ileocecal valve, which suggests that chewing gum can promote gastrointestinal motility. The possible physiological mechanism is that chewing gum is a form of false feeding. The false feeding method was used to study the first gastric juice secretion, that is, food does not enter the stomach, but can cause gastric juice secretion. The specific methods include chewing and spitting, chewing gum, etc. [10]. Its principle is to activate the secretion of gastric juice in the first stage, promote the secretion of gastrointestinal hormones and gastrointestinal motility. The behavior of false feeding and chewing stimulates intestinal motility through the mechanism of "head vagus nerve", which is an unconditioned reflex. During chewing, chewing gum can stimulate the receptors in the mouth, pharynx, throat, etc. Through the 5th, 7th, 9th, and 10th pairs of nerve afferent centers, the vagus nerve efferent reflex causes gastric juice secretion, thus promoting the acceleration of gastrointestinal peristalsis [11].

To sum up, chewing gum can promote the secretion of gastrointestinal fluid, thus promoting the peristalsis of gastrointestinal tract and shortening the time of intestinal preparation of patients; It is convenient, economical, safe, and sugar free gum has a high permeability effect, can stimulate intestinal emptying, and is conducive to intestinal cleaning; Because of its refreshing and sweet taste, chewing gum is easy for patients to feel relaxed and increase their sense of self comfort during chewing, enabling patients to complete the whole medication process in a relaxed state, reducing the incidence of adverse reactions in patients' intestinal preparation, improving patients' medication compliance and improving the effect of intestinal preparation, and providing guarantee for the smooth progress of colonoscopy. This method is economical, convenient, convenient for nurses to intervene, non-invasive for patients, less dangerous, and worthy of clinical promotion.

About the author: Li Jing (1993—), female, Han nationality, from Jiaocheng, Shanxi, bachelor degree, nurse in charge, research direction: Clinical nursing.

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Analysis of the Clinical Effectiveness of Antimicrobials in the Clinical Management of Gynecological Patients

YANG Hongxiang

Handan Central Hospital, Handan Hebei 056001, China

***Corresponding Author:** YANG Hongxiang*

Abstract: Objective: to understand the practical application of antibacterial drugs in gynecological patients. In order to prevent blindness or abuse of antibacterial drugs, we need to summarize a series of scientific and rational use of antibacterial drugs. Methods: 80 patients who were treated with antibacterial drugs in gynecology department of our hospital from February 22.3, 2021 were selected as the research objects, and they were divided into two groups according to the order before and after admission, namely, group A and group B, with 40 patients in each group, among which sulbactam was selected in group A and clavulanic acid was selected in group B. Then, the clinical adverse reaction rate and treatment effect of the two groups should be compared. Results: the total effective rate and adverse reaction rate of clinical treatment in the experimental group were 95.00% and 7.50% respectively, while those in the control group were 90.00% and 10.00% respectively. It was found that the difference was not obvious and there was no statistical advantage, P ＞ 0.05. Conclusion: in the process of treating gynecological diseases with drugs such as clavulanic acid and sulbactam, the clinical therapeutic effect of patients is very obvious, and there are no adverse reactions. Therefore, antibacterial drugs are worthy of application and promotion in the treatment of clinical gynecological diseases.

Keywords: *antibacterial agents; gynecology; clinical treatment; application effect*

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Introduction

At present, with the change of people's living habits, the prevalence of gynecological diseases has greatly increased. On a certain level, the invasion of bacteria is a key inducing factor of gynecological diseases. Therefore, it is very important and creative to choose antibacterial drugs for clinical treatment. Of course, there are many types of antibacterial drugs used clinically, such as antibiotics, imidazoles, sulfonamides, etc. It can play an active role in bacteriostasis and sterilization, and is very important for disease treatment and infection prevention. However, the clinical therapeutic effects of different drugs are completely different. In order to understand the practical application and effect of antibacterial drugs in gynecological diseases more concretely and comprehensively [1].

Generally speaking, many women have different degrees of bacteria in their bodies, especially different bacteria in their reproductive systems. Generally speaking, this kind of bacteria, microorganisms, etc. will not cause patients to get sick, but if patients have problems such as weak physical resistance and abnormal pathological state, they will cause the formation and appearance of diseases. If some patients don't make an accurate judgment in clinical treatment, they want to control the disease in a short time, so they usually choose broad-spectrum antibiotics for treatment, which can curb the activity of bacteria or kill them directly [2]. Generally speaking, however, many clinicians will make a scientific screening of related drugs based on their practical experience, or make a scientific screening according to the patients' economic level and changes in their condition. Next, the author selected 80 gynecological patients who were treated with antibacterial drugs at a certain stage in our hospital as the research object, discussed their clinical application of antibacterial drugs, and analyzed the practical clinical application value of antibacterial drugs. The relevant contents are as follows.

1 Objectives and Methods

1.1 General information

80 patients who received antimicrobial treatment in the department of gynecology of our hospital between March 2023 and February 2023 were selected as the study objects. They were divided into two groups according to the order before and after admission, namely, group A and group B, with 40 patients in each group. Among them, the age of the control group is between 22-73 years old, and the median value is (49.56 ± 2.13) years old. The age of the experimental group was between 23-78 years old, and the median was (49.44 ± 2.09) years old. The baseline data of the two groups were statistically compared. It was found that the difference was not significant and had no statistical value (P＞0.05); This experiment has been supported and approved by the Ethics Committee.

The screening criteria include: ① All patients have gynecological diseases and are hospitalized in gynecological clinics; ② The clinical data of all patients are clear and complete [3].

The screening conditions include: ① Those with endocrine disorder and coagulation dysfunction; ② Patients with allergic reactions to the selected drugs in this study [4].

1.2 Methods

Patients in group A chose sulbactam antibacterial drug (provided by Hainan Sinochem United Pharmaceutical Co., Ltd., 1.0g). The specific usage was: 1.0g drug was screened out, mixed with 150ml sodium chloride solution, and then the patients were instructed to receive drip therapy.

Patients in group B chose clavulanic acid (provided by Huabei Pharmaceutical Co., Ltd., 1.5mg), and the specific usage was: 1.5mg drug was screened out, mixed with 150ml sodium chloride solution, and then the patients were instructed to carry out drip therapy [5].

1.3 Index analysis

The total effective rate and adverse reaction rate of clinical treatment between the two groups were compared. As far as the evaluation of clinical treatment effect of patients is concerned, it includes four grades, namely, remarkable effect, effective effect, ineffective effect, recurrence and so on. Among them, significant effect-all clinical symptoms and discomfort of the patient completely disappear or disappear; Effective-the clinical signs and symptoms of patients have been significantly reduced and improved; Ineffective-the patient's clinical signs and symptoms have not changed or alleviated significantly [6].

Adverse reactions generally refer to: vomiting, nausea, rash, etc [7].

1.4 Data processing

The data of this study were statistically processed by SPSS28.0 software, in which the counting index was evaluated by (n,%), and then the χ^2 test was needed. The measurement index is ($\bar{x}\pm s$) for evaluation, and t-test is carried out. If $p < 0.05$, it can be seen that the difference is obvious.

2 Results

2.1 Comparison of clinical treatment efficiency between the two groups

After clinical treatment, it can be found that the total effective rates of the experimental group and the control group are 95.00% and 90.00% respectively, and there is no significant difference between the two groups ($P > 0.05$). See table 1.

Table 1 Statistical comparison of the effective rate between the two groups (n,%)

Group	Number of cases	Remarkable effect	Effective	Invalid	Effective rate of treatment/%
Experimental group	40	23	15	2	38(95.00)
Control group	40	20	16	4	36(90.00)
χ^2					14.002
P					0.512

2.2 Comparison of adverse reaction rate between the two groups

The adverse reaction rates of the experimental group and the control group were 7.50% and 10.00% respectively, and there was no significant difference between the two groups ($P > 0.05$). See table 2.

Table 2 Statistically comparison of the adverse reaction rate of the two groups (n,%)

Group	Number of cases	Vomit	Feel sick	Rash	Adverse reaction rate/%
Experimental group	40	1	1	1	3(7.50)
Control group	40	0	2	2	4(10.00)
χ^2					14.022
P					0.715

3 Discussion

3.1 Research conclusion

Clinically, there are many types of gynecological diseases, and most patients have different clinical manifestations, which will have different effects on patients' health. Nowadays, the treatment of gynecological diseases is generally seen in drug treatment, but the choice of different drugs has a great influence on the clinical treatment of patients, so we must strictly follow the principles of scientific and standardized drug use. Through investigation, it is found that most patients with gynecological diseases have problems such as bacterial infection, so the common drugs are mainly antibacterial drugs, and the clinical therapeutic effects of different types of antibacterial drugs are completely different [8]. In the research of this paper, we can find that: the author mainly makes a comparative analysis on the clinical application effects of sulbactam and clavulanic acid, and finally finds that the total effective rate and adverse reaction rate of the experimental group are 95.00% and 7.50% respectively, while those of the control group are 90.00% and 10.00% respectively. It is found that there is no obvious difference and no statistical advantage, P

＞ 0.05. According to this result, sulbactam was selected in Group A, and the patients had nausea, vomiting, rash and other adverse reactions. Group B chose clavulanic acid, and the patients had adverse reactions such as nausea and rash, which indicated that there was no obvious difference in the adverse reaction rate and the clinical treatment effect, which showed that the clinical application effects of these two antibacterial drugs were similar, and both of them could effectively control the patients' diseases [9]. From the mechanism of action, sulbactam is an irreversible competitive B- lactamase inhibitor, and its oral application effect is not obvious. Generally, it is mainly based on drip in clinic. According to the pharmacological reaction, after the drug enters the body, it can be combined with special enzymes, which can produce stress reaction, leading to the gradual weakening of the activity of special enzymes, thus having a strong inhibitory effect on B- lactamases formed by Gram-positive bacteria, negative bacteria, etc., so it can achieve antibacterial and disinfection purposes. Clavulanic acid also belongs to a common class of B-lactamases inhibitors. Because B- lactamases are synthesized by bacteria, if the activity of this class of enzymes can be weakened or made inactive, it will inevitably lead to drug resistance of bacteria. However, clavulanic acid can just inhibit B- lactamases, thus weakening the hydrolysis of antibiotics. Therefore, the drug has a very strong broad-spectrum inhibitory effect on B-lactamases produced by drug-resistant bacteria, so as to play a certain therapeutic effect in disease treatment [10].

3.2 Research experience

3.2.1 Overall usage of antibacterials

Antibiotics are commonly used in clinical gynecological diseases. They can generally play the role of antibiosis and sterilization, and have certain positive significance in preventing bacterial infection and invasion. Therefore, they can improve the clinical treatment effect of patients and reduce the adverse reaction rate after medication. However, due to the different mechanisms of action of different antibacterial drugs, it is necessary to scientifically select reasonable antibacterial drugs in combination with the disease types and actual needs of patients during clinical application, so as to achieve the ideal therapeutic purpose. It is worth noting that, with regard to the treatment of antibacterial drugs during the treatment of clinical gynecological diseases, we can find that it is very common for patients to use antibacterial drugs, but some problems such as abuse and misuse can easily occur during the use [11]. Through research, some scholars found that 600 patients in a gynecology department who received drug treatment from February 2021 to May 2022 were the experimental objects, and discussed and studied the specific situation of their clinical treatment. Among them, 370 patients chose antibiotics during the disease treatment, accounting for 61.67%; However, the purpose of choosing antibacterial drugs is generally more common in preventive treatment, that is to say, among 370 patients, the number of patients using preventive drugs is 322, accounting for 87.03%; In addition, there are two kinds of drug use modes, namely, single drug use and double drug use, with the number of cases being 135 and 200 respectively, accounting for 36.49% and 54.05% respectively. According to this data, it can be seen that the proportion of antibacterial drugs used in this hospital is 61.70%, which is far from the world health requirement of less than 30%, but it is not very high compared with the data that the average rate of clinical antibacterial drugs used in some gynecological hospitals in China is over 70% [12]. The reason may be that although the number of gynecological patients accepted by our hospital is relatively large, most of them are mainly clinical disease diagnosis, and the proportion of surgical treatment is not very high, so the utilization rate of antibacterial drugs is lower than the average utilization rate of gynecological hospitals in China.

3.2.2 Application trend and application time of antibacterial drugs

Through clinical research, many scholars can find that many gynecological hospitals generally achieve the purpose of preventive treatment in the process of returning to patients to use antibacterial drugs, but there is not much demand for disease treatment. For the clinical application of prophylactic antibiotics nowadays, the opinions and opinions given by clinical scholars are different, so there is a certain adjustment to this problem. However, combined with long-term clinical research results and a series of real clinical cases, it can be seen that prophylactic antibiotics are usually used before patients undergo surgery, but for some patients who have not undergone surgery, their use time will generally not exceed 3 days. The reason is that after the preventive antibacterial drugs are used for more than 3 days, the efficiency of infection prevention will gradually weaken, and some adverse reactions will occur, and even some drug-resistant strains will be formed, which will make the treatment of patients' diseases more difficult and complicated. According to the basic requirements of the Principles of Clinical Application of Antibacterials, it should not be used for more than 2 days in the prevention of infection in surgery. After the operation, due to the change of antimicrobial susceptibility to bacteria, some patients will have acute drug-resistant strains, so there is no need to continue medication at this time. For example, some scholars have conducted statistical analysis on the duration of the use of antibacterial drugs by gynecological patients, and found that they are basically concentrated in two different periods, namely, 1-3 days and 4-6 days, etc. The probability of the latter is very high, but it is generally dominated by gynecological patients undergoing surgical operations. In this case, it is relatively reasonable to insist on medication.

3.2.3 Types of common antibacterials in gynecology

At present, in the treatment of clinical gynecological diseases, common antibacterial drugs include

metronidazole, penicillin, cephalosporins, aminoglycosides and so on. Among them, the application probability of the first two kinds of drugs is very high. Through investigation, it is found that the use ratio of penicillins and metronidazole is generally 19.8% and 23.56% respectively, and the use probability of aminoglycosides is 12.23%. With regard to the clinical use of antibacterial drugs, we must pay attention to the application scope of the drugs, and at the same time, we need to know the adverse reactions and side effects. For example, if there are unreasonable phenomena in clinical use of metronidazole antibacterial drugs, it will induce tumors, etc., and its accumulation in milk is relatively high. Therefore, it is generally necessary to disable such drugs for breast-feeding patients with tumor diseases.

3.2.4 Selection of antibiotics in antibiotics

Because there are different types of bacteria in the body, especially in the female reproductive tract system, there are more than 10 kinds of bacteria, which usually do not cause disease under normal circumstances. However, if imbalance is found in the female body, it will lead to the formation of disease. However, most patients cannot directly determine the specific causative pathogens after the onset. Therefore, in this case, in order to curb the activity of related bacteria, many patients will blindly choose some low-cost broad-spectrum antibiotics with low drug properties. Based on the research of some scholars, it is found that the use of penicillin, cephalosporins, metronidazole and other antibiotics is the most common. Generally, they can be used alone or in combination, but the probability of dual use is the highest. However, before drug compatibility, it is necessary to pay attention to understand the incompatibilities of various antibacterial drugs, and explore the reasons, because in the case of blind combination of drugs. The probability of adverse reactions in patients is very high, and it will also lead to the formation of drug-resistant bacteria, which is not conducive to effective treatment of patients' conditions, but also will cause a series of treatment pressure and burden, and even lead to drug waste.

In a word, considering the problem of choosing antibacterial drugs during the treatment of gynecological diseases, although this is a very common clinical phenomenon, we must pay attention to the standardized application. After all, the abuse of antibacterial drugs in clinical practice is very common, so medical staff must strengthen the supervision of patients' antibacterial drugs, guide patients to use them in a standardized and scientific way, and maximize the safety and effectiveness of clinical drug use. Therefore, the treatment of the patient's condition can achieve the goal of consolidation.

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Observation on Effect of 0.05% Cyclosporine Eye Drops Combined with 0.3% Sodium Hyaluronate Eye Drops on Dry Eyes after Cataract Surgery

ZHU Jin

Qian'an Yanshan Hospital, Tangshan Hebei 064400, China

***Corresponding Author:** ZHU Jin*

Abstract: Objective: to observe the curative effect of 0.05% cyclosporine eye drops combined with 0.3% sodium hyaluronate on dry eyes after cataract surgery. Methods: from June 2021 to September 2021, 78 patients (78 eyes) who underwent Phaco+IOL surgery in our hospital were diagnosed with dry eye after routine use of eye drops for one month. They were randomly divided into two groups according to the order of treatment, with 39 cases in each group. The control group used 0.3% sodium hyaluronate eye drops, while the observation group used 0.05% cyclosporine eye drops combined with 0.3% glass. Results: after treatment, BUT and SIt of the two groups were significantly longer than before treatment, while FL was significantly lower than before treatment. All indexes of the observation group combined with 0.05% cyclosporine eye drops were better, that is, BUT, SIt and FL were better, and the total effective rate of the observation group was significantly higher than that of the control group, with statistical significance (P＜0.05). Conclusion: for dry eyes after cataract surgery, the application of 0.05% cyclosporine eye drops combined with 0.3 sodium hyaluronate eye drops has obvious curative effect, which is worth popularizing.

Keywords: *0.05% cyclosporine; 0.3% sodium hyaluronate; dry eyes after cataract surgery*

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Cataract is a blinding disease, and its clinical treatment is mainly surgery. At present, the mainstream surgical method is Phaco+IOL (Phacoemulsification combined with intraocular lens implantation). Because of its short surgical time and relatively mature technology, the success rate of cataract surgery is almost 100% in hospitals with relatively complete technical equipment. However, due to the surgical operation and the influence of some drugs during the perioperative period, the secretion function of corneal epithelium and conjunctival goblet cells is damaged to a certain extent, especially the change of tear osmotic pressure and the production of various inflammatory factors, which break the steady state of tear film on the ocular surface, resulting in symptoms such as dry eyes, astringent eyes and fatigue, leading to dry eyes [1]. It is reported that the incidence of dry eye after cataract extraction is 9.8%-72.6%[2]. Studies have shown that 60% ～ 90% of patients can have abnormal ocular surface in the early stage after surgery, and some patients can't recover for 1 ～ 3 months or longer. If timely and effective treatment is not given, it will cause adverse effects on visual function, and then affect normal work and life [3-4]. The clinical treatment for this disease is usually local medication, and the commonly used drugs mainly include sodium hyaluronate, polyvinyl alcohol, recombinant bovine basic fibroblast eye drops or eye ointment and other eye surface lubricants [5], aiming to improve the discomfort of patients, so as to create a repair environment for the eye surface, and use the patient's own repair ability to repair the eye surface. However, usually the symptoms are not treated, and the treatment time is often long, the patients felt that the curative effect was not good. The main objective of this article is to observe the effect of 0.05% cyclosporine eye drops and 0.3% sodium hyaluronate eye drops on dry eyes after cataract surgery.

1 Materials and Methods

1.1 General information

From June 2021 to September 2021, Phaco+IOL was performed in our hospital. After one month of routine use of eye drops such as antibiotics, 78 patients (78 eyes) were definitely diagnosed as dry eyes according to diagnostic criteria [6]. Inclusive criteria: ① The cataract surgery was smooth. ② There was no dry eye before operation, and dry eyes were diagnosed after operation. ③ There is no need to add other drugs except conventional drugs after operation. ③ Informed consent of patients. Exclusion criteria: ① Diseases affecting the ocular surface such as eyelid ectropion, trichiasis, etc Systemic diseases such as diabetes, systemic connective tissue and autoimmune diseases. The patients were divided into reference group and observation group by parity method according to the order of treatment, 39 patients in each group. In the reference group, male: female=18:21, age 69.20 ±3.05 years. In the observation group, male: female=20:19, age 69.14 ±3.42 years old.

Table 1 Comparison of related indexes of patients with dry eye before and after treatment

Group	Number of cases(n)	Tear film rupture time (s)		Tear secretion results (mm)		Fluorescent staining of cornea (points)	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Reference group	39	4.79±1.31	8.23±2.20	2.98±1.01	4.84±0.81	4.44±1.03	1.41±0.74
Observation group	39	4.87±1.07	11.01±2.07	2.86±0.96	7.32±1.80	4.32±1.04	0.94±0.59
T	/	0.0859	13.8070	0.0898	6.4981	0.0788	15.1526
P	/	0.9445	0.0000	0.9206	0.0000	0.9373	0.0000

There is no statistical significance ($P > 0.05$) in comparing the general information and dry eye degree of the two groups of patients, which is comparable, as shown in Table 1.

1.2 Methods

Both groups of patients have performed Phaco+IOL operation in our hospital. The operation was performed by the same person. The operation was successful. The limbal incision was taken, and there was no corneal epithelium and conjunctiva damage during the operation. After the operation, hormone eye drops, non steroidal eye drops, antibiotic eye drops and artificial tears were routinely used. The routine re examination was performed in the outpatient department 1 day, 1 week, 2 weeks and 4 weeks after the operation, and the drug was stopped at 1 month according to the ocular inflammation. Collect dry eye patients after drug withdrawal.

1.2.1 Reference group

The group was treated with 0.3% sodium hyaluronate eye drops (Shengtian Pharmaceutical Co., Ltd., GYZZ H20173248), and the usage was 1 drop 4 times a day.

1.2.2 Observation group

On the basis of the treatment of the reference group, this group was combined with 0.05% cyclosporine eye drops (Shenyang Xingqi Eye Drops Co., Ltd., GYZZ H20203239), which was used twice a day.

Both groups were treated for 3 months.

1.3 Observation index

Statistical analysis and comparison of relevant data, namely BUT, SIt and FL, respectively indicate tear film rupture time, tear secretion length and corneal fluorescein staining. The curative effect and adverse reactions were compared between the two groups. As follows [7]:

1.3.1 BUT measurement method

Drop sodium fluorescein into the upper bulbar conjunctiva, observe with cobalt blue light, instruct the patient to blink for 3 ～ 4 times, then open his eyes, stare ahead, and calculate the time from the opening of his eyes to the appearance of the first dark spot. Take the average value after three consecutive measurements.

1.3.2 SIt measurement method

Use a 5mm×35mm filter paper, fold it at 5mm at one end and put it in the conjunctival sac at the middle and outer third of the lower eyelid, instruct the patient to close his eyes lightly, and expose the other end naturally outside the eyelid. After 5 minutes, take out the filter paper to measure the length of infiltration.

1.3.3 FL examination method [8]

After BUT examination, continue to observe with cobalt blue light, divide the cornea into four quadrants, and observe the corneal fluorescein staining in each quadrant. If there is no staining, it will be 0; If there are less than 30 staining spots, it will be 1; If there are more than 30 staining spots but no fusion, it will be 2; If there is fusion of staining spots, it will be 3, totaling 0-12.

1.3.4 Curative effect judgment and cured

The symptoms of the patient disappeared, but ＞ 10s; Remarkable effect: The symptoms of dry eye were significantly improved, BUT it was 5 ～ 10s; Effective: symptoms of dry eye were improved, but ＜ 5s; Invalid: the patient felt no improvement, but ＜ 5s. Total effective rate = cure rate+remarkable efficiency+effective rate.

1.4 Statistical analysis

Through SPSS22.0 software, the counting data and measurement data are expressed by statistical symbols, which are% and ($\bar{x}\pm s$) in turn. The two inspection methods are χ^2 inspection and T inspection in turn. The difference was statistically significant ($P < 0.05$).

2 Results

2.1 Comparison of BUT, SIt and FL between the two groups before and after treatment

After treatment, the BUT and SIt values of the two groups were significantly higher than those before treatment, while the FL was significantly lower than that before treatment. After treatment, all indexes of the observation group of combined treatment were better, that is, BUT, SIt and FL were better, and the difference was statistically significant ($P < 0.05$). See table 1.

2.2 Comparison of curative effect between the two groups

The total effective rates of the observation group and the reference group were (92.3%,36 /39) and (74.4%, 29/39) respectively, and the difference was statistically

significant (χ^2 = 4.501 p ＜ 0.05), as shown in Table 2. After 3 months of medication, no adverse reactions such as allergy and infection were found in both groups.

Table 2 Comparison of curative effect between two groups [cases (%)]

Group	Number of cases	Cured	Remarkable effect	Effective	Invalid
Reference group	39	2(5.0)	13(35.0)	14(35.0)	10(25.0)
Observation group	39	5(12.5)	19(50.0)	12(30.0)	3(7.5)
χ^2	/		4.501		
P	/		0.034		

3 Discussion

With the progress of cataract surgery technology, the continuous optimization of various surgical AIDS and intraocular lens materials, and the increasingly accurate measurement of intraocular lens power, almost all cataract patients' vision after surgery has been improved, and surgeons are more and more able to grasp the success of cataract surgery. However, even so, some patients are not satisfied with the surgical results after surgery. These patients' tangled places have changed from unsatisfactory vision improvement in the past to complaining about eye discomfort, such as eye astringency, dry eyes, eye pain, foreign body sensation and even vision fluctuation. These symptoms are caused by dry eyes, and even some patients have stubborn symptoms and doubt about the operation [3].

Dry eye is a chronic ocular surface disease caused by many factors. It is the instability of tear film or the imbalance of ocular surface microenvironment caused by the abnormal quality, quantity and dynamics of tears, which may be accompanied by ocular surface inflammatory reaction, tissue damage and nerve abnormality, resulting in various ocular discomfort symptoms and/or visual dysfunction [9]. The key mechanism of the formation or aggravation of dry eyes after cataract surgery lies in inflammation, instability of tear film and high osmotic pressure of tears [10]. Analysis of specific causes: ① Toxic effects of drugs before, during and after operation. ② Exposure injury of keratoconjunctiva under microscope during operation. ③ The toxic effect of inflammatory factors caused by surgical irritation on the conjunctival epithelium. ④ Corneal nerve injury. ⑤ The morphological change of corneal incision leads to the steady change of tear film [11], which to some extent damages the intrinsic cells of the ocular surface, especially the conjunctival goblet cells, resulting in the decrease of the secretion function of goblet cells, the loss of the quality and quantity of tears, and the formation of dry eyes [12]. Studies have shown that dry eye after cataract surgery, if not treated in time, is the most obvious at 1 month after surgery and recovered at 3 months after surgery. However, all inspection indexes are still lower than those before surgery, and some patients' dry eyes can't recover at 6 months, and even develop into chronic dry eyes, which has adverse effects on patients' work and life [13-16]. Clinically, in view of the symptoms and signs of dry eye after some ophthalmic operations, some scholars put forward the name "operation-related dry eye" [17], which can be classified as dry eye after cataract surgery.

According to the severity of dry eyes, the treatment methods are different. Mild patients are mainly treated with local drugs, while moderate and severe patients need physical assistance or surgical treatment. Dry eyes after cataract surgery are generally mild and moderate. Clinically, the treatment of dry eyes after cataract surgery focuses on anti-inflammation, promoting corneal repair and stabilizing tear film, mainly on drug therapy. Especially in the early stage, the eye inflammation is severe, and sufficient anti-inflammation is the key to establish the steady state of tear secretion [18]. Therefore, in clinic, anti-inflammatory drugs and artificial tears are routinely used for one month after cataract surgery. One month after operation, the patients with dry eyes were treated with 0.05% cyclosporine eye drops and 0.3% sodium hyaluronate eye drops, and the curative effect was observed. Cyclosporine is a kind of lipophilic cyclic polypeptide with 11 amino acids from fungi. It is also a highly effective immunosuppressant and an internationally recognized prescription drug for treating dry eye. Its pharmacological effects are mainly through selectively and reversibly inhibiting the activation of T lymphocytes, inhibiting the release of inflammatory factors such as interleukin -1, interferon γ and tumor necrosis factor α, promoting T cell apoptosis and blocking the vicious circle of inflammation [19]. Moreover, it can inhibit the apoptosis of lacrimal acinar cells, directly promote the release of neurotransmitters, improve the nerve feedback of tears, inhibit the apoptosis of goblet cells, increase the storage and secretion of intracellular mucin, and directly promote the improvement of the quality and quantity of tears [20]. Therefore, 0.05% cyclosporine eye drops is a strict dry eye treatment drug. Previous studies have shown that 0.05% cyclosporine eye drops can significantly improve the symptoms and signs of dry eyes after cataract surgery, increase the thickness of tear film lipid layer, improve corneal perception and improve the visual quality after cataract surgery [21]. Sodium glass is a macromolecular polysaccharide biomaterial with high viscoelasticity, hydrophilicity and lubricity, which can reduce the friction of eye tissues, stabilize the tear film and prolong the tear film rupture time. Studies have shown that the application of high concentration sodium hyaluronate in dry eyes after cataract surgery can more effectively promote the repair and stability of tear film [22]. The reason is that high concentration sodium hyaluronate, besides the common characteristics of sodium hyaluronate, can be linked with

protein, effectively promote the extension of corneal epithelial tissue, accelerate the healing of incision, and will not produce immune response [23]. In this study, after 0.3% sodium hyaluronate eye drops were used in the reference group, BUT and SIt were significantly longer than before treatment, and FL was significantly lower than before treatment, which indicated that 0.3% sodium hyaluronate eye drops had a good effect in dry eye patients. Combined use of the two drugs can treat symptoms and root causes from the exterior to the interior, and can further improve the ocular surface state of patients and relieve their discomfort.

The results of this study showed that the BUT, SIt and FL of the treatment group with 0.05% cyclosporine eye drops combined with 0.3% sodium hyaluronate eye drops were significantly better than those of the control group, and the comparison between the two groups was statistically significant. This shows that 0.05% cyclosporine eye drops combined with 0.3% sodium hyaluronate eye drops can optimize the eye symptoms of patients with dry eye after cataract surgery, which shows the curative effect of 0.05% cyclosporine eye drops in the treatment of dry eye, which is safe and worthy of popularization.

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Imaging Analysis of Ankylosing Spondylitis

SHAO Xiaoli

Matang Traditional Chinese Medicine Hospital of Xianning, Xianning Hubei 437100, China

***Corresponding Author:** SHAO Xiaoli*

Abstract: Objective: to explore and analyze the value of imaging examination in the diagnosis of ankylosing spondylitis. Methods: 10 cases of ankylosing spondylitis treated in our hospital from July 2021 to March 2022 were selected as sample cases. All patients underwent imaging examination, and the final results of imaging examination and diagnosis were compared. Results: by comparing the imaging results with the final diagnosis results, it was found that there was no significant difference between the imaging results and the final diagnosis results (P＞0.05), which indicated that the imaging examination was feasible. Conclusion: in the diagnosis of ankylosing spondylitis, the use of imaging examination can improve the diagnostic efficiency and provide reliable data for the future treatment of ankylosing spondylitis, which is worthy of clinical attention and promotion.

Keywords: *imaging examination; ankylosing spondylitis; diagnostic effect*

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Introduction

Ankylosing spondylitis is a disease characterized by inflammation of sacroiliac joints and spinal attachment points. It is an autoimmune chronic inflammatory disease, which is related to many factors such as heredity, immunity, environment and trauma. Hereditarily, it is confirmed that the gene related to ankylosing spondylitis is HLA-B27, and patients are often screened clinically. For patients with ankylosing spondylitis, 90% of patients have positive genes. Infection is mainly related to the pathogenesis of ankylosing spondylitis, such as Klebsiella pneumoniae. As well as other factors such as trauma environment. Ankylosing spondylitis is mainly caused by young men clinically. The main symptoms are pain in lumbosacral and lumbosacral parts, swelling and pain of unilateral joints of major joints of limbs and pain in heel of Achilles tendon. Fibrosis and ossification of the annulus fibrosus of intervertebral disc and the adjacent connective tissue are its pathological features, which are also the main reasons for the stiffness and rigidity of the spine in patients with ankylosing spondylitis and the unfavorable movement. Ankylosing spondylitis is a kind of seronegative spondyloarthropathy, which includes psoriatic arthritis, reactive arthritis and so on. Clinically, it is necessary for patients to make corresponding diagnosis and treatment in specialist clinics [1-2].

1 Materials and Methods

1.1 General information

The sample cases were 10 patients with ankylosing spondylitis who were treated in our hospital from July 2021 to March 2022. The age was 21-42 years old, with an average age of 32.85 ± 1.63 years old. The general data of ankylosing spondylitis patients were comparable (p＞0.05).

1.2 Methods

All patients were examined by imaging (nuclear magnetic resonance, CT and X-ray) and pathological examination.

1.3 Observation index

Compare the imaging results of patients with the final diagnosis results [3-4].

2 Results

Comparison of diagnostic accuracy

By comparing the results of imaging examination and pathological examination, there is no significant difference (P＞0.05), and the difference is not statistically significant, as shown in Table 1.

Table 1 Comparison of diagnostic accuracy of patients (%)

Group	Number of cases	Diagnosed as ankylosing spondylitis	Accuracy rate
Diagnosed results	10	10	10(100.00)
Imaging examination results	10	9	9(90.00)
χ^2			1.0526
P			0.3049

3 Discussion

Ankylosing spondylitis is an immune disease that occurs in young and middle-aged men. It is a chronic inflammatory disease and belongs to the category of

rheumatology immunology. Its main manifestation is inflammation of sacroiliac joints, spine and peripheral joints, which will lead to bony fusion. In China, the incidence of ankylosing spondylitis is 0.25%-0.5%. For example, there can be one ankylosing spondylitis patient in 200 people, and the ratio of male to female is about 4:1. The incidence of male is much higher than that of female. In addition, the onset of women is relatively slow, and the condition is relatively mild. The onset age is usually 13-31 years old, and the peak age of onset is 20-30 years old. Incidence before 8 years old and after 40 years old is relatively rare. Therefore, ankylosing spondylitis is a kind of rheumatology and immunology disease with low incidence, but great influence on people's future life and quality of life. Harm of ankylosing spondylitis: 1 Ankylosing spondylitis will have some clinical symptoms, which will cause the pain of sacroiliac joint, lumbago and back of spine, pain and swelling of peripheral joint, heel pain, vision damage outside the joint, occasional heart involvement, lung involvement, kidney involvement and nervous system involvement, and the existence of these clinical symptoms will affect the patient's normal life, work and quality of life. 2 The long-term existence of ankylosing spondylitis can cause: 1 The rigidity of the spine affects the patient's long-term mobility. 2 It may affect one joint, that is, the hip joint, and the involvement of the hip joint. Although this is not a very high proportion, it may account for about 16%, but it will eventually lead to femoral head necrosis. 3 Long-term ankylosing spondylitis even causes vertebral fracture, which affects the spinal cord. Therefore, ankylosing spondylitis is not particularly serious in most cases, but it also needs to be given enough attention. At present, the cause of ankylosing spondylitis is not particularly clear, but up to now, in fact, many studies have shown that the disease is related to many factors, the first is genetic factors, the second is environmental factors, and the third is immunological abnormalities. Genetic factors still play an important role in the pathogenesis of ankylosing spondylitis. In fact, many people know that there is such a gene as HLA-B27, which is related to the pathogenesis of ankylosing spondylitis. It was found that the positive rate of HLA-B27 was 10%-20% among the first-degree relatives of the patient, that is, his parents and children, and the risk of the disease was 20-40 times higher than that of the general population. Specific studies have found that HLA-B2704, B2705 and B2702 subtypes are related to the onset of this disease. Among the external environmental factors, two infections, Klebsiella pneumoniae infection and chlamydia infection in intestinal tract and urinary system, are found to be related to the onset of ankylosing spondylitis, which is one of its inducing reasons. Third, there are some immunological abnormalities in patients with ankylosing spondylitis, including serum immunoglobulin, circulating immune complex, interleukin-6 and interleukin-10, etc. Therefore, the onset of ankylosing spondylitis is a disease induced by many factors [1-4]. Ankylosing spondylitis is a kind of rheumatism, or autoimmune disease, which is common in young men. The symptoms of ankylosing spondylitis can be summarized into three aspects: 1 First of all, young boys are prone to illness, and the other main symptom is recurrent back pain. Often, some patients complain that they may have obvious back pain at night, and even wake up with pain. It's hard to turn over in the morning, and their neck activity is limited, which is called morning stiffness. 2 Patients with ankylosing spondylitis will have swelling and pain of peripheral joints, such as ankles, knee joints, and even sternoclavicular joints of upper limbs. 3 Patients with ankylosing spondylitis will also have some extra-articular manifestations, such as sudden redness of eyes and poor eyesight, which is called iridocyclitis. Hematuria in the kidney, combined with IGA nephropathy, may cause some unexplained diarrhea in the intestinal tract, and the symptoms of diarrhea may appear for a long time. Even some patients may have some symptoms such as aortic valve insufficiency, pulmonary fibrosis and so on. Therefore, ankylosing spondylitis should pay attention to the performance outside the joints besides lumbago and joint pain. The diagnosis of ankylosing spondylitis has the following points: 1 Clinical manifestations: Ankylosing spondylitis can be suspected when the patient has back stiffness, heel pain, and pain at some muscle attachment points. Because ankylosing spondylitis is not a bone change, but a muscle attachment point, that is, inflammation occurs when muscles attach to joints, which leads to the above symptoms. Many patients have heel pain, especially walking pain, and back stiffness, which causes pain when pressing sacroiliac joints. Some patients with younger onset age, such as 15-18 years old, have leg pain and aggravated hip pain at the earliest stage of activity, and get a little better after rest, but sometimes the longer the pain, the worse the situation, which is often misdiagnosed as growth pain clinically, and has not attracted attention; 2 Laboratory examination: Genetic examination. Patients with HLA-B27 positive are more likely to suffer from ankylosing spondylitis than patients with HLA-B27 negative, and the risk may be 3-4 times or higher. In addition, the examination of inflammatory indicators such as ESR and C-reactive protein, as well as X-ray, CT and nuclear magnetic resonance examination, can detect lesions and make early diagnosis. Early medication can control the development of the disease, so that the disease can be alleviated. Ankylosing spondylitis is generally treated in a conservative way, thus delaying the development of the disease and improving clinical symptoms. If the joint productionSerious impact, which can be treated by surgery. Ankylosing spondylitis is a common chronic inflammatory disease in clinic, which belongs to the treatment scope of Rheumatology and Immunology. Usually, the main pathological parts of ankylosing spondylitis are sacroiliac joints, spine and peripheral joints, and the symptoms are not too severe at

first. With the development of the disease, patients may have spinal deformity, spinal rigidity and hip rigidity, which seriously affect their lives. Taking conservative treatment first can effectively relieve clinical symptoms, and you can also take some drugs, such as nonsteroidal anti-inflammatory drugs, such as ibuprofen, to effectively relieve clinical pain. If the joint is severely deformed and its activity is restricted, artificial joint replacement can be adopted to improve life treatment.

Ankylosing spondylitis is a rheumatic disease, and the average incubation period is 6 years from its onset to clinical diagnosis. This intermediate patient may have various discomfort and joint lesions, but in fact, it often invades some large axial joints, such as hip joint and sacroiliac joint. Ultrasound is also very advantageous in examining the hip joint, because the early joint lesion of ankylosing spondylitis is a tendon terminal disease. In addition, the changes of synovium, the diagnosis and examination of the end of tendon by ultrasound are very clear, and it is also very sensitive to synovium and joint effusion. In clinic, sometimes it has been painful for 2-3 years and has been treated as lumbar disc herniation, or simply as the treatment of hip synovitis. After ultrasonic diagnosis, ankylosing spondylitis still has some characteristics. For example, unlike transient synovitis or simple synovitis, ankylosing spondylitis has no change to the end of bones and tendons. Ankylosing spondylitis often thickens at the end of tendons during hip joint examination, especially at the attachment end of femoral head. Tendon thickening will lead to a false deformation of femoral head. At this time, basically, he will be prompted to do further clinical tests, because the diagnosis of ankylosing spondylitis is not based on a certain imaging, but a comprehensive evaluation, including clinical symptoms, laboratory indicators and other imaging data. Ultrasound can give him some early tips to avoid misdiagnosis. For ankylosing spondylitis, imaging examination is an important basis for diagnosis and staging. There are common X-ray examination, CT examination, magnetic resonance examination and musculoskeletal ultrasound examination, which are as follows: 1. X-ray examination: One of the most commonly used examination methods, which mainly takes the anteroposterior and anteroposterior radiographs of sacroiliac joints and lumbar vertebrae. Sometimes, it is necessary to take extraarticular radiographs of hips, knees and shoulder joints to supplement the diagnosis. But the sensitivity of X-ray examination is low, which is not conducive to early diagnosis. Generally speaking, if the imaging abnormality occurs, it will come to the middle and late stage. X-ray manifestations mainly include the following aspects: sacroiliac joint: 98%-100% of cases have changes of sacroiliac joint under X-ray in the early stage, which can be divided into five grades. Grade 0 is normal sacroiliac joint, while Grade I shows osteoporosis, widened joint space, suspicious bone erosion and blurred joint surface. Grade Ⅱ showed slight destruction of articular surface, blurred joint edge, slight sclerosis, and cystic degeneration. Grade Ⅲ is the manifestation of joint destruction and reconstruction, with obvious narrowing of joint space, blurred edges, definite cystic degeneration, hardening of both sides of the joint and increased density. Grade Ⅳ is mainly sclerosis, joint clearance disappears, joint fusion or ankylosis; Spine: The early stage is characterized by general osteoporosis, and the lumbar spine straightens due to the small curvature of normal lordosis. In severe cases, vertebral compression fractures may occur. In the later stage, the vertebral body becomes square, the bone bridge is formed, and the spine shows characteristic bamboo-like changes. Around the joint: the gap between the hip and shoulder joint is narrowed, and new bones attached with ligaments can be formed, including metatarsal osteophyte and periostitis at the attachment of Achilles tendon [5-7]; 2 CT examination: CT examination is much more sensitive than X-ray examination, and the shooting position is consistent with that of X-ray examination. CT imaging findings of ankylosing spondylitis mainly focus on sacroiliac joints: the first grade is suspected or extremely slight sacroiliitis. The second grade is mild sacroiliitis, with blurred joint edges, hardening of the area near the joint and slight narrowing of the joint space. The third grade is moderate sacroiliitis, with obvious blurring of joint edges, hardening of proximal joints, narrowing of joint space and obvious bone destruction. Grade 4 sacroiliac joint fusion or complete rigidity, with or without sclerosis. If the patient's imaging conforms to sacroiliitis, unilateral grade 3 to 4 or bilateral grade 2 to 4, and meets more than one clinical standard, it can be diagnosed as ankylosing spondylitis. 3 Magnetic resonance examination: the most sensitive and sensitive examination method at present. Arthritis of axial spondyloarthropathy is also a major diagnostic basis. The main manifestations are edema on the joint surface, synovial hyperplasia, and even bone invasion and destruction, which can be shown in the early stage. It is also an important basis for future treatment to observe curative effect. On the MRI, bone marrow edema can be seen in the sacrum or ilium of the patient's sacroiliac joint, that is, whitening and signal enhancement can be seen on T2 image [8-9]. There will be effusion between sacroiliac joints, that is, there will be brightness, whitening and signal enhancement on T2 image and T2 fat image of nuclear magnetic resonance, which is the earliest manifestation of sacroiliitis of ankylosing spondylitis. There will be further bone calcification, that is, ligament calcification. At this time, osteophyte formation can be seen. 4 Musculoskeletal ultrasound examination: It is mainly aimed at joints outside joints, and the effect is sensitive. It can be manifested as edema of joints, edema of tendon and muscle attachment points, and synovial hyperplasia, which are the main manifestations. Bone ultrasound examination is mainly used for the examination of peripheral joints and extra-articular soft tissues, including tendons, myofascias

and synovitis. Under the guidance of ultrasound, it can also be used to observe deep tissues such as hip joints, especially joints with rich blood flow [10]. Imaging examination has just talked about four aspects, among which magnetic resonance examination is sensitive. If ankylosing spondylitis is suspected, it should be examined with magnetic resonance as early as possible. In this study, 10 patients with ankylosing spondylitis were examined by imaging, and the diagnostic accuracy was high, which was consistent with the final diagnosis result.

To sum up, taking imaging examination and diagnosis for patients with ankylosing spondylitis in clinic can effectively judge the condition and provide basis for follow-up treatment, which is worth popularizing.

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Design and Application of Customized Personalized Prostheses

LI Mingyang [1*], WANG Kunbo [2], WANG Jianchao [2], CHANG Lulu[3], CHEN Liye[4], SHEN Biao[4]

1. Beijing Zhongnuohengkang Biotechnology Co., Ltd, Beijing, China
2. Beijing Chunlizhengda Medical Instruments Co.,Ltd, Beijing,China
3. Beijing Yipukangda Medical Technology Co., Ltd, Beijing, China
4. Beijing Huakang Tianyi Biotechnology Co., Ltd, Beijing, China

***Corresponding Author:** Mingyang Li*

Abstract: The article introduces the advantages and characteristics of customized personalized prostheses, as well as their applications in orthopedic surgery, dental treatment, cranial reconstruction, and cosmetic surgery. It elaborates on the process of designing and applying customized personalized prostheses, using customized acetabular revision prostheses as an example. The article discusses in detail the process of designing customized personalized prostheses based on the Paprosky or AAOS classification, combined with clinical demand. The personalized prostheses are ultimately manufactured using advanced technologies such as 3D printing. Finally, the article looks towards the future development prospects of customized personalized prostheses.

Keywords: *customized individualized prostheses; revision prosthesis; acetabular defect classification; 3D printing; prosthesis design*
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Introduction

The development of prosthetic design and manufacturing technology has made great progress, however, traditional prosthetic design still has some limitations, such as the inability to meet personalized needs for prosthetic shape, size, and material. With the continuous advancement of science and technology, the design and application of customized personalized prostheses has become a new research hot spot. In clinical applications, due to differences in body structure and morphology, conventional prostheses are difficult to fully meet the personalized needs of patients [1], which is particularly prominent in some complex surgical cases. To better meet the needs of patients, the design of customized personalized prostheses has emerged.

This article will explore the advantages and characteristics of customized personalized prostheses from clinical needs and prosthetic applications, and discuss the application process of customized personalized prosthetic design, and look forward to future development.

1 Customized Individualized Prosthetic Structure Features and Advantages

Compared with traditional prosthetic design, customized individualized prosthetic design has the following features and advantages:

1.1 Features of Customized Individualized Prosthetic

(1) Personalized customization: Customized individualized prosthetic design can be customized according to the specific needs of the patient, such as the shape, size, material of the prosthesis can be adjusted according to the patient's needs to better adapt to the patient's body structure. (2) High precision: Customized individualized prosthetic design uses digital technology, which can accurately measure and simulate the patient, thereby achieving precise positioning and adjustment of the prosthesis. (3) Better function: Compared with traditional prostheses, customized individualized prostheses can better restore the patient's function. For example, in joint replacement surgery, customized individualized prostheses can better restore the patient's joint mobility and improve surgical outcomes. (4) Reduced surgical risk: Due to the better adaptation of customized individualized prostheses to the patient's body structure, surgical risks can be reduced. In addition, due to the high accuracy, surgical time can be greatly reduced. (5) Improved patient experience: Customized individualized prostheses can improve the patient's surgical experience by better adapting to the patient's body structure, reducing postoperative discomfort and pain, and so on. In summary, customized individualized prosthetic design has a high degree of personalization and precision, can improve surgical outcomes and patient experience, reduce surgical risks, and is an important technology that traditional prosthetic design cannot replace.

1.2 Advantages of Customized Individualized Prostheses

(1) Improving surgical outcomes and patient quality of life: Since customized individualized prostheses are designed and manufactured based on the patient's body structure and needs, they can better adapt to the patient's actual situation, improve surgical outcomes, and enhance the patient's quality of life. For example, in artificial joint replacement surgery, the use of customized individualized

prostheses can better restore the patient's original joint structure and function, avoiding problems such as inappropriate size or shape of traditional standard prostheses, thereby reducing the incidence of adverse consequences such as prosthetic loosening, dislocation, and pain.

(2) Reducing surgical risks and complications: The design and manufacture of customized individualized prostheses use digital technology and 3D printing technology, avoiding problems such as size deviations and shape mismatches that may occur in manual production, thereby reducing the incidence of surgical risks and complications. For example, the use of customized individualized prostheses in cranial repair surgery can better adapt to the complex shape and size of the patient's skull, reducing the risk of skull damage during surgery, and better repairing skull defects, improving surgical outcomes.

(3) Improving treatment efficiency: The manufacture of customized individualized prostheses using digital technology and 3D printing technology is faster and more accurate than traditional manual production, which can improve surgical efficiency and treatment outcomes. For example, the use of customized individualized prostheses in dental implant surgery can better adapt to the patient's oral structure and tooth shape, reducing surgery time and shortening the recovery period.

(4) Reducing the total cost of treatment: Although the manufacturing process of customized individualized prostheses is more complex, it can reduce the risk of postoperative complications and patient reoperation compared to traditional standardized prostheses, which can reduce the total cost of treatment in the long run.

(5) Promoting technological progress: With the development of digital technology and 3D printing technology, the manufacturing technology of customized individualized prostheses is constantly innovating and developing, promoting the application and development of digital technology and 3D printing technology in the medical field. With the continuous maturity and progress of technology, the application scope of customized individualized prostheses is also constantly expanding, covering multiple fields such as artificial joint replacement, cranial repair, dental implantation, etc. At the same time, it also promotes the development and innovation of the medical industry and provides better treatment options and outcomes for patients.

Customized individualized prostheses have many advantages, such as improving surgical outcomes and patient quality of life, reducing surgical risks and complications, improving treatment efficiency, reducing the total cost of treatment, promoting technological progress, etc. With the continuous development and improvement of technology, customized individualized prostheses will be more widely used and promoted in the future, bringing more benefits and convenience to patients [2-5].

2 Current status of customized personalized prosthetics application

Customized personalized prosthetics is an important advancement in modern medical technology. It can tailor prosthetics to the specific needs, body shape, and condition of patients, thereby improving the effectiveness and success rate of surgical treatments, reducing surgical risks and complications. Currently, customized personalized prosthetics have been widely used in various fields such as orthopedic surgery, dental treatment, cranioplasty, and plastic surgery.

Firstly, orthopedic surgery is one of the most widely used fields for customized personalized prosthetics. In orthopedic surgery, customized personalized prosthetics are used to treat diseases such as fractures, joint replacement, spinal surgery, and hip replacement based on the patient's bone morphology, pathological condition, age, and gender [6-9]. Customized personalized prosthetics can improve the accuracy and effectiveness of surgical treatment. For example, in joint replacement surgery, doctors can use computer-aided design software to make prosthetics that are perfectly matched to the patient's joint size and shape, resulting in more accurate and stable surgical outcomes.

Secondly, dental treatment is also an important field for customized personalized prosthetics. In dental treatment, customized personalized prosthetics are mainly used for dental implantation, teeth correction, and repair of dental defects [10-11]. By using customized personalized prosthetics, dentists can make prosthetics that are most suitable for the patient's oral cavity based on the patient's tooth size, shape, and location, thereby improving treatment effectiveness and patient comfort.

Thirdly, cranioplasty is another important field for the application of customized personalized prosthetics. In cranioplasty, customized personalized prosthetics are mainly used to treat diseases such as skull defects and fractures [12]. By using customized personalized prosthetics, doctors can make prosthetics that are most suitable for the patient's skull size, shape, and bone quality, thereby improving the success rate of surgical treatment and patient's quality of life.

Finally, plastic surgery is another important field for the application of customized personalized prosthetics. In plastic surgery, customized personalized prosthetics are mainly used to repair and improve the face and body. By using customized personalized prosthetics, doctors can make prosthetics that are most suitable for the patient's facial and body shape, contours, and other factors, thereby improving the effectiveness of plastic surgery and patient satisfaction [13-15].

Customized personalized prosthetics is an important advancement in modern medical technology and has been widely used in various fields such as orthopedic surgery, dental treatment, cranioplasty, organ transplantation, and plastic surgery. By using customized personalized prosthetics, doctors can make prosthetics that are most suitable for the patient's specific condition, thereby

improving the effectiveness and success rate of surgical treatments, reducing surgical risks and complications. With the continuous development and improvement of technology, the application prospects of customized personalized prosthetics will become broader, bringing more innovation and progress to the medical industry.

3 Customized Individualized Prosthesis Design Process

The process of customized individualized prosthesis design typically includes the following stages:

(1) Clinical needs assessment: The doctor evaluates the patient to understand their specific condition, physical condition, and special needs to determine whether customized prosthesis design is needed. At the same time, the doctor also needs to ask detailed questions and understand the patient's medical history, allergies, etc.(2) Imaging examination: The doctor selects appropriate imaging examination methods, such as X-rays, CT scans, MRI, etc., to conduct a comprehensive imaging examination of the patient to obtain relevant anatomical structure information.(3) Image data processing: After the imaging examination, the doctor processes the obtained image data and converts it into a three-dimensional data model.(4) Design stage: Based on the image data model, the engineer designs the individualized prosthesis, develops a prosthesis plan that meets the patient's special needs.(5) Manufacturing: After the design stage is completed, the engineer manufactures the customized individualized prosthesis based on the design plan.(6) Surgical implementation: After manufacturing is completed, the doctor implants the customized individualized prosthesis into the patient during surgery.(7) Postoperative follow-up: The doctor needs to follow up with the patient after surgery, observe whether the prosthesis meets the design requirements, and promptly handle any postoperative complications that may occur.The focus of the customized individualized prosthesis design process is on the design stage, which is the most critical link in the entire process. In the design stage, the engineer needs to develop an individualized prosthesis design plan based on imaging examination data and the patient's specific condition. This process requires accurate and rigorous design to ensure that the prosthesis can perfectly integrate with the patient's body structure.

4 Design process of custom individualized acetabular revision prosthesis using the example of customized individualized acetabular revision prosthesis design

4.1 Theoretical basis for designing custom individualized acetabular revision prosthesis

The principle of designing acetabular revision prosthesis is based on the classification and analysis of acetabular defects. Currently, the commonly used classification systems are Paprosky classification and AAOS classification system [18].

The Paprosky classification divides acetabular defects into three levels based on the degree and location of the defect. Level 1 defect refers to an acetabular wall defect of less than 50%, level 2 defect refers to an acetabular wall defect greater than 50% but less than or equal to 50% of the circumference, and level 3 defect refers to an acetabular wall defect greater than 50% of the circumference. In addition, defects can also be classified into different types based on their location, such as anterior superior defect, posterior superior defect, and posterior inferior defect. Different repair methods and prosthesis designs need to be used for different types of acetabular defects.

The AAOS classification system, on the other hand, divides defects into three categories, A, B, and C, based on the location, degree, and type of acetabular defect. Type A refers to anterior superior edge defects, type B refers to acetabular wall defects, and type C refers to posterior edge defects. In the actual design process, different repair methods and prosthesis designs need to be selected based on different types of defects.

4.2 Customization of Individualized Acetabular Revision Implant Design Process

The goal of acetabular revision implant design is to restore the function of the acetabulum and address any defects while maintaining its stability. The process involves the following steps: (1) obtaining the patient's imaging data: doctors use imaging techniques such as CT and MRI to obtain three-dimensional data of the patient's body. This data serves as the basis for designing a customized implant and provides detailed structural information of the patient's body part [19]. (2) Three-dimensional modeling: based on the patient's imaging data, designers use computer software to create a three-dimensional model that simulates the patient's actual structure and design an implant based on the doctor's requirements. (3) Optimizing the design: designers evaluate and optimize the initial design. During this process, they consider aspects such as structure, material, and production processes to ensure that the design meets the patient's needs and medical standards [20]. (4) Generating the implant's CAD drawings: based on the final design, designers generate the implant's CAD drawings, which are used in the subsequent production process. (5) Manufacturing the implant prototype: technical personnel from the production company use 3D printing or other manufacturing techniques to produce a prototype of the implant based on the CAD drawings. These prototypes are used for quality inspection and testing. (6) Conducting quality inspection of the implant: the production company conducts rigorous quality inspection and testing of the implant prototype. During

this process, they check for issues related to the implant's size, structure, material, production process, etc., to ensure that the implant's quality meets medical standards and the patient's needs [21]. (7) Manufacturing the customized implant: based on the prototype's test results, the production company begins to manufacture the customized implant. During this process, they use high-precision machine equipment to produce the implant's structure according to the CAD drawings. (8) Conducting quality control of the implant: the production company performs quality control on the manufactured implant. During this process, they conduct multiple tests and monitoring to ensure that the implant meets medical standards and the patient's needs [22]. (9) Delivery to the doctor and patient: the production company delivers the customized implant to the doctor and patient. Under the guidance of the doctor, the implant is installed inside the patient's body to ensure its stability. This process involves multiple links and requires support and cooperation from various professional and technical aspects to ensure the quality and effectiveness of the customized implant.

5 Outlook

Overall, customized individualized prostheses have broad prospects in the medical field. In the future, with the continuous advancement of technology and deepening research, we believe that customized individualized prostheses will continue to improve and develop in the following aspects: (1) materials: Currently, most customized individualized prostheses use biologically inert materials. In the future, more biocompatible and mechanically performing materials will be explored to achieve more perfect biological composite effects. (2) Technology: Currently, the design of customized individualized prostheses mainly relies on computer-aided design and 3D printing technology. In the future, more advanced digital technology, simulation technology, etc. will be developed to further improve design accuracy and realism. (3) Applications: Currently, customized individualized prostheses are mainly used in the orthopedic field. In the future, it will involve more extensive medical fields, such as dentistry, cardiovascular, and other fields. (4) Clinical aspects: Future customized individualized prostheses will be closer to clinical needs. For example, combining individualized prostheses with stem cell technology to accelerate bone formation and biological repair, etc.

As a typical representative of personalized medicine, customized individualized prostheses will play an increasingly important role in the future medical field, bringing better medical services and treatment effects to more patients.

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Study on Antihypertensive Effect of Ginseng, Pueraria Lobata and Other Medicinal and Edible Chinese Herbal Medicines

ZU Wenqi, SANG Ziyan, ZHANG Yuxin, ZHU Lili*

College of Biology and Food Engineering, Jilin Teachers College of Engineering and Technology, Changchun, Jilin 130052

***Corresponding Author:** ZHU Lili*

Abstract: Hypertension is now recognized as one of the major public health problems in the world, and it is also one of the most important risk factors of cardiovascular and cerebrovascular diseases. Hypertension has seriously endangered people's life and health, so it is particularly important to prevent and treat hypertension. Although the homology food of medicine and food in China has an early origin and many kinds, few of them can form a scale and go abroad. According to statistics, there are more than 400 kinds of food in China, which are based on traditional Chinese medicine with the same origin as medicine and food. We use modern biotechnology to study ginseng, pueraria lobata and other Chinese herbal medicines, obtain active substances with antihypertensive components, and develop related products with antihypertensive function.

Keywords: *ginseng; Pueraria lobata; Hawthorn; Corn silk; Coix seed; Medicine and food are homologous; lower blood pressure*
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Hypertension is one of the most common cardiovascular diseases, and it is also the main risk factor leading to congestive heart failure, stroke, coronary heart disease, renal failure and aortic aneurysm. According to the World Health Organization's global disease burden research report, hypertension has become the second largest risk factor affecting global mortality. With the aging of the population in China, the number of patients with hypertension may continue to increase, and the situation of prevention and treatment is grim. The prevalence of hypertension in China is increasing year by year, and it is close to 20% at present. Every year, 2 million people in China die from diseases related to hypertension. Moreover, more than 60% of patients with coronary heart disease, more than 70% of patients with cerebral infarction and 90% of patients with cerebral hemorrhage have a history of hypertension. If the adult's blood pressure is ≥140mmHg and/or 90mmHg, it is hypertension. Common risk factors of hypertension lurk in our daily life, including: high-salt diet, overweight or obesity, long-term excessive smoking and drinking, heavy work pressure, mental stress, irregular work and rest time, etc [1].

From diuretics in the 1960s to β -blockers in the 1970s, to calcium channel antagonists and angiotensin converting enzyme inhibitors in the 1980s. Through years of clinical application, the therapeutic effect of these drugs has been affirmed by clinicians and patients. However, in the process of clinical application, the side effects of these drugs are becoming more and more obvious. With the deepening of people's understanding of the pathogenesis of hypertension, new drugs aimed at new and more effective targets have been developed one after another. This product is a kind of antihypertensive health food, based on the concept of homology of medicine and food, using the effective antihypertensive components in Chinese herbal medicines, making precise proportions, and adopting modern biotechnology to independently develop. It has no toxic side effects and high safety [2].

1 Homology of Medicine and Food and Antihypertensive Market

1.1 Development status of homology of medicine and food

With the development of society, the increasing number of sub-healthy people and the strategy of "healthy China", the traditional Chinese medicine health preservation of "medicine comes from food, tableware is effective, and medicine is edible" is becoming increasingly prosperous. Both food and traditional Chinese medicine come from nature, and human beings know about food earlier than drugs. In the process of foraging, people gradually realize that some substances can harm people's health or cause death, which is poison. Some substances can make sick people better, that is, drugs. The homology of medicine and food refers to those traditional Chinese medicines that can be used for clinical use and animals, plants and fungi that can be eaten daily. The modern definition of "homology of medicine and food" refers to a kind of long-term harmless Chinese herbal medicines which are classified as edible and medicinal by the relevant state departments and have a long tradition of eating habits, including edible animals and plants, fungi and spices. Since the Zhou Dynasty, there have been records of medicinal and edible plants, such as the descriptions of Lycium barbarum, pueraria lobata, Zanthoxylum bungeanum and mulberry in the Book of Songs. It was not until the appearance of Shennong Herbal Classic in Han Dynasty that people gradually got to know about edible plants [3]. "Five grains,

five animals, five fruits and five vegetables are described in Huangdi Neijing Tai Su. If they are used to satisfy hunger, they are called food, and if they are used to treat diseases, they are called medicine". This is the most clear record about the definition of dual-use medicine and food, and it is also the first documentary record of homology description of medicine and food. Studies on the dual-use of medicine and food in the treatment of diseases show that the homologous foods of medicine and food have obvious advantages in lowering blood pressure, relieving fatigue, lowering blood sugar, resisting oxidation and losing weight, and they also play an important role in the prevention and treatment of epidemic situation in COVID-19. At present, the dual-purpose food for medicine and food is favored by middle-aged and elderly people and even young people because of its safety, universality, treatment and health preservation and certain physiological effects, and it has become a hot topic for people. In addition, people's requirements for health preservation and health are increasing day by day, and the application of medicine and food homologous resources has attracted much attention and attention, and has been widely used in food and health care industry, which can improve people's sub-health and promote the development of Chinese medicine and economy [4].

1.2 Development Status of the Step-down Market

In China, hypertension, as the most common cardiovascular disease, has a low treatment rate, which poses a great threat to people's health. Long-term use of antihypertensive drugs is an effective medical means to control and treat hypertension at present. In the future, with the aging of the population, the rapid increase in the number of hypertensive patients and the enhancement of people's awareness of preventing hypertension, the market size of antihypertensive drugs will continue to expand, but the expansion rate will slow down day by day, and the growth rate of compound antihypertensive drugs with better treatment effect will gradually accelerate [5].

Although the market size of antihypertensive drugs is increasing year by year, it may not increase too much market space with the release of new guidelines. On the one hand, according to the clinical guidance of the new guidelines, all the patients newly added after adjusting the standards in the new guidelines do not necessarily need to take medicine; On the other hand, after intensive collection, the price of antihypertensive drugs has been as low as a few cents. For example, after the commonly used antihypertensive drug valsartan is collected, each tablet is only 0.1 yuan, and amlodipine tablets are as low as 0.07 yuan per tablet. Obviously, it is hard to say how much performance increase this favorable situation can bring to many generic drug companies due to extremely low drug prices. For innovative drugs, the reduction of diagnostic criteria may bring new growth space. But the premise is that truly innovative drugs have significant advantages in terms of efficacy or safety [6].

1.3 Development status of homology of medicine and food

As a traditional, long-standing and systematic discipline in China, Chinese medicine pays attention to the whole and dialectical treatment in the treatment of diseases, and it also pays attention to "preventing diseases". However, the treatment of disease is to prevent it first, and the prevention of disease is to keep in good health at ordinary times. The ancients paid more attention to the changes and development of natural laws and the methods of keeping in good health by diet, such as supplementing qi and nourishing kidney with black food and supplementing iron and nourishing blood with red food. With the improvement of people's material living standard and the development and application of medicine and food homologous herbs, modern people gradually tend to keep in good health by diet, which makes people pay more attention to the choice of this kind of food in their daily life, and achieve the purpose of strengthening their physical function and preventing diseases by adopting the method of medicinal diet therapy in their daily diet [7].

When developing medicinal and edible homologous herbs, we should interpret the safety and supplement of medicinal herbs, develop and utilize medicinal and edible homologous products with safety, tonic and flavor, and at the same time, develop new processing methods. However, in the development and application, we should also pay attention to summarizing the nature, taste, meridian tropism and efficacy recorded in ancient materia medica and medical books, follow the principles of application compatibility and conditioning, understand the true meaning of ancient prescriptions and their unique formula rules, and make full use of the essence of Chinese medicine prescriptions. It is also necessary to establish a relationship with modern physiological effects, and to combine modern technical means to analyze the components-targets-pathways of the developed medicinal materials to develop new therapeutic effects while eating them daily. With the improvement of people's material living standards, accelerating the development and application of medicinal materials with the same origin of medicine and food can also promote the development of traditional Chinese medicine tourism, promote the modernization of traditional Chinese medicine and promote the development of "healthy China" [8].

2 Study on Antihypertensive Components of Ginseng, Pueraria Lobata and Other Medicinal and Edible Chinese Herbal Medicines

2.1 Research and extraction of antihypertensive components from ginseng

2.1.1 Study on Ginseng-Ginsenoside

Different ginsenosides have different effects on

blood pressure, and have two-way regulating effects of boosting and lowering blood pressure. Some ginsenosides can reduce blood pressure by regulating the expression of nitric oxide synthase in endothelial cells, stimulating vasodilation and blocking calcium channels at the same time. At the same time, some studies have shown that ginseng also contains components that raise blood pressure. In general, ginsenoside Rb1, Rb2, Rb3, Rc, Rd, Rg3, Rh2 and glycosyl PD are the main antihypertensive components in ginseng. In general, ginsenoside Re, Rg1, Rg2, Rh1, glycosyl PT and other protopanaxatriols are the main components with antihypertensive effect in ginseng.

2.1.2 Extraction of Ginsenoside

The yield of water extraction is low, water-soluble impurities become more, and water is not easy to store, which is prone to mildew. The main solvents extracted by organic solvent extraction are methanol, ethanol and n-butanol, which leads to more organic impurities in the extract, darker color of the product and lower purity of total ginsenoside. The ultrasonic extraction method has the advantages of less solvent consumption, high extraction efficiency and no influence on the activity of ginsenoside. Ultrasonic extraction is a normal temperature extraction method, which does not need heating. Ultrasonic extraction is a physical process, and there is no chemical reaction in the whole soaking extraction process, which effectively avoids the inactivation and loss of effective components of ginsenoside due to high temperature or chemical reaction in the extraction process. At the same time, the ultrasonic soaking extraction time is short, only 30-60min is needed, which saves the extraction time and improves the extraction efficiency. Ultrasonic extraction was carried out under the conditions of ethanol concentration 60%, solid-liquid ratio 1∶35, temperature 70℃ and extraction time 45min [9].

2.2 Research and extraction of antihypertensive components from Pueraria lobata

2.2.1 Study on Pueraria lobata-Flavonoids and Puerarin

The main components of pueraria lobata for lowering blood pressure are pueraria lobata total flavonoids and puerarin. After intravenous injection of pueraria total flavonoids and puerarin, it can dilate peripheral blood vessels to a certain extent, reduce blood pressure, slow down heart rate and reduce myocardial oxygen consumption. Huang Wei and others found in clinical and basic research that puerarin can reduce plasma endothelin (ET) and platelet surface activity, enhance myocardial contractility, inhibit platelet aggregation and adhesion, reduce blood lipid, cholesterol and blood viscosity, and prevent thrombosis. It can dilate peripheral blood vessels, improve microcirculation and vascular endothelial cell function, reduce the ratio of thromboxane to prostacyclin, dilate cerebral vessels, increase cerebral blood flow and improve cerebral oxygen supply [10].

2.2.2 Extraction of Flavonoids and Puerarin from Pueraria lobata

The main methods of extracting effective components from pueraria lobata are heating reflux method, percolation method, alkali liquor method, leaching method, etc., but there are many problems such as high energy consumption, long time and low efficiency. Ultrasonic-assisted extraction is a new extraction technology, which uses the mechanical effect, cavitation effect and thermal effect of ultrasonic wave to accelerate the diffusion and release of plant effective components in solvent and promote the full mixing of plant effective components with solvent. Using ultrasonic wave to extract pueraria flavonoids and puerarin has obvious auxiliary effect, which can effectively improve the extraction rate, shorten the extraction time and save the cost. Weigh the coarse powder of Radix Puerariae, put it into a triangular bottle with a stopper, add 95% ethanol by volume, pre-soak it for 100Wmin, ultrasonic extract it twice, each time for 30min, combine the two extracts, and concentrate the extracts [11].

2.3 Research and extraction of antihypertensive components from hawthorn

2.3.1 Study on hawthorn-flavone

Crataegus pinnatifida, a dry and mature fruit of Rosaceae, is a traditional Chinese medicine for invigorating stomach and promoting digestion. It is rich in flavonoids, organic acids, triterpenoids, polysaccharides and other chemical components, and has many pharmacological effects such as antioxidation, blood lipid regulation, blood sugar reduction and anti-inflammation. Hawthorn was selected into the list of medicinal and edible medicinal materials issued by the former Ministry of Health in 2002, which is widely used in the fields of medicine and food. The main chemical components of hawthorn are flavonoids, flavans and their polymers, organic acids and so on. The antihypertensive effect of hawthorn is mainly composed of flavonoids and triterpenoid acid hydrolysates contained in hawthorn.

2.3.2 Extraction of flavonoids from hawthorn

There are two ways to extract hawthorn flavonoids by ultrasonic treatment technology. Ultrasonic-assisted ethanol extraction was used to extract flavonoids from hawthorn fruit, and ultrasonic-assisted extraction was used to extract flavonoids from hawthorn peel. Both of them are pretreatment of raw materials, material-liquid ratio mixing, ultrasonic extraction technology, centrifugation, determination of absorbance of supernatant, rotary evaporation, concentration and drying, and finally the crude flavonoids are obtained [12].

The extraction rate of total flavonoids in hawthorn fruit was 11.31% when the ethanol concentration was 70%, the ratio of material to liquid was 1:30(g/ml), the ultrasonic power was 400W, the temperature was 55℃ and the extraction time was 40min.

Ultrasonic power 100W, ethanol concentration 60%,

solid-liquid ratio 1:10 (g/mL), extraction time 30min, extraction temperature 80℃ and extraction times 4 times, the extraction rate of total flavonoids in hawthorn peel residue can reach 4.41%.

2.4 Research and extraction of antihypertensive components from corn silk

2.4.1 Study on stigma maydis-flavonoids and polysaccharides

There are many kinds of chemical constituents in corn stigma. At present, there are 153 chemical constituents isolated from corn stigma, including flavonoids, terpenoids, sterols, saponins, polysaccharides, amino acids and organic acids. Based on the clinical function of corn stigma, scholars at home and abroad have started a lot of research on its chemical constituents since the 1920s, and found that corn stigma contains many chemical constituents such as phytosterol, flavonoids, allantoin, inositol, polysaccharides, volatile alkaloids, saponins and so on. Polysaccharides have hypoglycemic, diuretic and weight-reducing effects, while flavonoids have cardiotonic, coronary artery dilating and antihypertensive effects. The hypotensive effect of corn stigma is the result of the complementary and mutual cooperation of various chemical components [13].

2.4.2 Extraction of flavonoids and polysaccharides from corn stigma

Extraction of total flavonoids: corn must be dried in an oven, crushed and sieved. Take corn stigma powder, add a little water to mix, adjust pH to 10 with NaOH, soak for 1 h, ultrasonic for 30 min at 30℃, filter, cool, adjust pH to 4 with HCl, stand overnight, remove supernatant, add water to recrystallize the precipitate, and filter to obtain total flavonoids.

Extraction of polysaccharide: Weigh the defatted corn stigma powder in a beaker, add distilled water according to the ratio of liquid to material of 20:1(mL/g), mix well, soak at 60℃ for 1 hour, and then use ultrasonic power. 450 W extraction for 1h (ultrasonic instrument works intermittently, ultrasonic for 2s, and stops for 4s). After the extraction, centrifuge at 4000r/min for 10min, separate the residue, collect the extract, filter the extract under reduced pressure, dialyze the clear liquid for 24 hours, and determine the quality of polysaccharide in the solution by anthrone-sulfuric acid method with glucose as standard.

2.5 Research and extraction of hypotensive components from coix seed

2.5.1 Study on coix seed-coix seed oil

Coix seed contains coix seed fat, coix seed oil, sitosterol and alkaloids with high medicinal value, which have the effects of regulating blood lipid and lowering blood pressure. It has the function of dilating blood vessels, and can dilate peripheral blood vessels, especially pulmonary capillaries. It can dilate blood vessels and lower blood sugar, and has certain antihypertensive and hypoglycemic effects.

2.5.2 Extraction of coix seed oil

Solvent extraction (low temperature extraction): Generally, some soluble substances in the complex carrier are transferred from solid to liquid, which is essentially a mass transfer process from solid phase to liquid phase. The organic solvents for volatile oil extraction are usually petroleum ether, ethanol, dichloromethane, acetone, cyclohexane ethyl acetate, etc., which are continuously refluxed, distilled, impregnated, etc., then separated, and the solvent in the extract is evaporated at low temperature to obtain volatile oil. Coix lachryma-jobi seed oil was extracted from Coix lachryma-jobi seed by ethanol distillation, the ethanol concentration was 95%, the extraction temperature was 50℃ and the extraction time was 60min. Under these conditions, the extraction rate of Coix lachryma-jobi seed oil was 4.2%.

Ultrasonic-assisted extraction: the cavitation effect, thermal effect and mechanical effect generated by ultrasonic wave are used in the extraction process of traditional Chinese medicine components. By destroying the cell wall and increasing the solvent penetration, the extraction rate is improved and the extraction time is shortened, so as to achieve the purpose of extracting cell contents efficiently and quickly.

3 End and Future Outlook

Hypertension is one of the main diseases that threaten people's health in our country, and it is also a stubborn disease. It obviously increases the damage of target organs such as heart, brain, kidney and blood vessels, and it needs to take drugs continuously to maintain the normal blood pressure. Although the antihypertensive effect of traditional Chinese medicine compound is not as fast as that of western medicine, its function is multi-link, multi-channel and multi-target. While lowering blood pressure, it also takes into account other pathological links of hypertension, and has the functions of improving microcirculation, reducing blood lipid and antioxidation, protecting endothelium and regulating vasoactive substances. Therefore, traditional Chinese medicine compound can obviously improve the clinical symptoms of hypertension and improve the quality of life of patients, and it also has unique advantages in the protection of target organs.

This product uses Chinese herbal medicines with the same origin of medicine and food as raw materials. In the process of traditional Chinese herbal medicines, it is usually used by steaming, boiling and cooking. However, the use of effective active ingredients in Chinese herbal medicines such as ginseng and pueraria after cooking will lead to the inactivation, degradation and pharmacological effects of some substances at high temperature.

We adopt a brand-new independent research and development method, based on the study of edible Chinese herbal medicines in Compendium of Materia Medica, carry out compatibility of Chinese herbal

medicines, and follow the "four qi and five flavors" method, the five elements of Chinese herbal medicines are mutually compatible, and the Chinese herbal medicines are eighteen evils and nineteen fears. Based on the secret recipe and the theory of homology of medicine and food, the traditional Chinese medicine "boiling in water" was improved. In order to effectively ensure the activity of antihypertensive effective components in raw materials, we independently developed and compared the experimental data, and finally decided to use ultrasonic extraction technology and low-temperature extraction technology for extraction. Modern extraction technology is used instead of ancient method to extract the essence and make it according to the proportion, thus reducing the cost on the basis of the same amount of raw materials. The core technology that we use to replace the ancient method is ultrasonic extraction and low temperature extraction technology to improve the utilization rate of effective components in raw materials.

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Study on Influencing Factors of Clinical Laboratory Specimen Collection

LI Zhihui

Zibo 148 Hospital, Zibo, Shandong, 255300

***Corresponding Author:** LI Zhihui*

Abstract: With the development of modern medicine, people's health awareness is constantly improving, and people pay more attention to their physical health. With the continuous progress of medical technology, the level of clinical examination has also been significantly improved. As an important part of medical work, clinical examination plays an important role in the diagnosis of patients' condition. However, there are many factors that will affect the test results in the collection of clinical test specimens, so how to improve the quality of test specimen collection has become a common concern of medical staff. This paper starts with the main problems and reasons in the process of specimen collection, and puts forward corresponding solutions according to these problems. The purpose of this paper is to provide effective reference for improving the collection quality of clinical laboratory specimens, so as to make the clinical laboratory work more standardized and standardized.

Keywords: clinical examination; Specimen collection; influencing factor
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1 The main problems and reasons in the process of specimen collection

The main problems in the process of clinical specimen collection are as follows: (1) Patients cannot collect specimens by themselves and need the help of medical staff; (2) The amount of samples collected is insufficient, which causes the time of sample collection to be prolonged; (3) Some patients can't cooperate well with medical staff to collect specimens, which leads to the failure of specimen collection. Among them, the first problem is mainly because patients can't take blood by themselves. Because most patients don't take the initiative to inform the medical staff when they are unwell or painful, they don't take the initiative to ask patients if they have discomfort symptoms when collecting samples. As a result, most patients do not know their physical condition before taking blood, but only know that they have some kind of disease. But I don't know how to collect specimens, which leads to the failure of specimen collection. The second problem is caused by the working attitude of medical staff. Many medical staff can't answer patients' questions in time and communicate with patients patiently at work, which leads to patients' nervousness, thus affecting the effect of specimen collection. The third problem is that some patients are not familiar with the blood collection process. Many patients have misunderstandings or difficulties about the blood collection process because of their older age or mobility difficulties. In order to avoid these problems, medical staff should explain the blood collection process and precautions to patients in detail, so that patients can cooperate with medical staff to collect samples.

1.1 Effective communication between medical staff and patients

Some patients can't take the initiative to inform the medical staff before taking blood because of their own health problems or physical pain. Many medical staff will not take the initiative to ask patients whether they have discomfort symptoms when taking blood, but collect samples directly. As a result, some patients don't know their own physical condition, and there are misunderstandings about the location and amount of blood collected during blood collection. Some patients will have dizziness, nausea, vomiting and other symptoms, but they don't know the blood collection site. Therefore, when collecting specimens, medical staff should ask patients whether they have discomfort symptoms, so they need to inform patients of the uncomfortable parts, relevant blood collection points and blood collection amount.

Many patients didn't know the location and amount of blood before collecting samples, which led to the failure of sample collection. In addition, some patients will be nervous, resulting in increased heart rate, increased blood pressure, muscle contraction and other phenomena. When these phenomena appear, medical staff should explain the information such as blood collection location and blood collection amount to patients in detail, so that patients can collect samples correctly. There are also some patients who ask the medical staff whether they have pain symptoms before collecting samples because of

physical pain, and then take blood samples. However, some medical staff did not understand the causes of patients' pain, which led to the failure of blood collection. In addition, some medical staff are not serious or impatient when collecting specimens, which leads to some patients' misunderstanding or difficulty in collecting specimens, thus affecting the effect of specimen collection.

1.2 The working attitude of medical staff

In the process of clinical laboratory specimen collection, the working attitude of medical staff has a great influence on the specimen collection effect. For example, when collecting blood routine, some patients will have dizziness, palpitation, nausea and other symptoms. If the medical staff can't answer the questions raised by the patients in time during the blood routine test, it will lead to the patients' nervousness before taking blood, which will affect the accuracy of the blood routine test results. In addition, some medical staff can't explain the blood collection process and precautions to patients in detail before blood collection, which will lead to patients' nervousness. Therefore, in order to avoid these problems, medical staff should do the following things at work: (1) Answer patients' questions in time; (2) Carefully explain the blood collection process and precautions to patients; (3) Explain the blood collection process and precautions to patients in detail; (4) Strengthen communication with patients to improve work efficiency; (5) Continuously improve their own quality and professional level [1].

2 Methods of collecting specimens correctly

2.1 General methods of collecting specimens

(1) Preparation before blood collection: Pay attention to rest before blood collection, don't be too tired, and ensure adequate sleep time; It is not advisable to eat before blood drawing, so as not to affect the test results; The bladder should be emptied before blood collection to avoid holding urine.

(2) Collection method: It is generally recommended to take venous blood for inspection at 6-8 am. Taking blood on an empty stomach in the morning is beneficial to reduce the influence on liver function, blood sugar and other test items, but it is generally recommended to be on an empty stomach for more than 6 hours when carrying out biochemical and immune test items. It is usually suggested that blood should be sent for inspection immediately after blood drawing, and it does not need to be placed for a long time. However, in order to avoid hypoglycemia in patients, the samples can be placed in the refrigerator at 2-4℃ for several hours before being sent for inspection. If the patient is tested in the hospital, the medical staff can directly collect samples for inspection and make relevant records.

(3) Blood collection method: During blood collection, attention should be paid to avoid disinfection with alcohol at the blood vessel puncture site; In the process of blood collection, blood vessel rupture caused by excessive force should be avoided; When taking blood, it is necessary to ensure that the needle is perpendicular to the skin surface and penetrates under the skin; Avoid using tourniquet or applying pressure at puncture point to stop bleeding, so as not to affect the normal morphological changes of red blood cells in blood, thus affecting the test results. At the same time, different blood collection methods should be adopted for special groups such as children, pregnant women and the elderly.

2.2 Special methods of collecting specimens

For long-term bedridden patients, attention should be paid to taking the correct posture to collect specimens. Usually, patients are advised to take blood collection in a sitting or semi-lying position; For patients with urination, samples can be collected in time after urination; For patients taking hypoglycemic drugs for a long time, blood samples should be taken within 2 hours after taking hypoglycemic drugs; For patients with a history of diabetes or hypertension, blood should be collected within 2 hours after taking the medicine; For patients who are taking anticoagulants or antiplatelet drugs, blood samples should be taken within 1 hour after taking them; Blood samples should be taken on an empty stomach for patients with obesity or who need insulin therapy. In addition, it should be noted that in order to avoid the influence of samples mixed with blood on the test results, it is necessary to strictly check the anticoagulants used when collecting samples.

2.3 Precautions

(1) Different specimen collection methods will affect the test results. It is suggested that patients should be trained before collecting specimens, so that they can understand the correct methods of collecting specimens and strictly implement them. At the same time, medical staff should communicate with patients in time to let them know the changes of their condition.

(2) Before collecting specimens, patients should be informed of laboratory tests in advance, so that patients can go to the hospital in time; At the same time, it is necessary to inform the patient's family members of the test items and results in advance; In addition, it is necessary to explain the specimen collection method and matters needing attention to patients.

(3) should avoid the use of irritating or special smell items such as cotton swabs, gauze, etc.

(4) In the process of collecting specimens, actions that may cause skin damage, such as excessive force or repeated rubbing, should be avoided.

(5) When collecting specimens, operate according to the requirements of medical staff, and operate in strict accordance with regulations; At the same time, the blood collection site or blood collection tool should be replaced in time according to the patient's condition change.

3 Measures to improve the accuracy of inspection results

(1) Before specimen collection, the purpose, process and matters needing attention of specimen collection should be explained to the patient, so as to ensure that the patient clearly understands the relevant contents before specimen collection, and at the same time, various influencing factors that may occur during specimen collection should be explained to the patient.

(2) Do a good job in the management of test specimens. It is necessary to strengthen the management of test specimens to ensure the accuracy of the number of test specimens. At the same time, establish a good communication channel between the laboratory and the clinical departments to avoid unnecessary disputes caused by the inconsistency between the test results and the clinic.

(3) Improve the professional level and professional quality of clinical laboratory personnel, cultivate their good professional ethics and improve their sense of responsibility in their work.

(4) To establish a sound management system and rules and regulations, and strengthen the training of nursing knowledge and skills for medical staff. At the same time, it is necessary to strengthen the professional ethics education for medical staff, so that they can strictly implement relevant regulations in their work and be serious, responsible and standardized.

(5) For some special circumstances, such as pregnant women, children, the elderly and other people, the restrictions on the collection of test specimens should be appropriately relaxed. At the same time, the test specimens should be inspected and processed in time to avoid variation due to too long time and ensure the authenticity and reliability of the test results.

(6) Through the above measures, we can improve the collection quality of clinical test specimens, ensure the accuracy of test results, and provide reliable basis for clinical treatment.

3.1 Importance of Clinical Examination

With the continuous development of science and technology, the methods of diagnosis and treatment in hospitals are becoming more and more advanced. Doctors diagnose patients through instruments and equipment, determine the types and causes of patients' diseases, and then formulate reasonable and effective treatment plans according to patients' conditions. The test results are one of the important reference for doctors to formulate treatment plans. The process of clinical examination is to detect various physiological indexes and biochemical indexes of patients, and finally present the test results. This process will involve the detection of various physiological and biochemical indexes, so clinical examination plays a very important role in medical diagnosis.

Clinical examination can help doctors to understand the patient's condition and its changes, so as to formulate effective treatment plans and help doctors treat patients in time. At the same time, clinical examination can also help doctors to understand the patient's physical condition and living habits, and provide accurate and reliable data for doctors. In addition, clinical examination can also help doctors to judge whether patients have potential diseases, whether there are complications and the severity of complications. If the clinical test results are abnormal, doctors can take corresponding treatment measures for patients according to the test results, such as whether surgery and drug adjustment are needed, so as to avoid unnecessary medical disputes caused by misdiagnosis.

3.2 Analysis of Factors Affecting the Quality of Specimen Collection

(1) The collection time mainly refers to the process from the preparation of patients to the collection of test specimens. Under normal circumstances, patients should ensure adequate rest time when preparing for the collection of test specimens, and collect specimens in a good mental state. At the same time, we should also ensure that patients can't be in a state of fatigue before starting to collect samples, so as to avoid dizziness, nausea and other symptoms in the process of blood collection. In addition, patients should avoid taking drugs containing anticoagulants, such as aspirin, before the examination, so as not to affect the test results.

(2) Blood collection site refers to the samples collected from the patient's skin or oral mucosa, subcutaneous fat, joint space and retroperitoneal tissue. The clinical test results have certain uncertainty and repeatability, so when collecting test specimens, we should choose hard and not easy to be damaged parts as much as possible. In general, patients should maintain emotional stability before blood collection.

(3) Blood collection method refers to the method adopted after the specimen is put into the container. For the general healthy population, direct blood collection can usually be used. For some special people, such as pregnant women, the elderly, children and other people, the test tube method or aspiration method should be used. In addition, we should also pay attention to the correct way of blood collection needle in clinical examination to ensure the accuracy of the test results. Before collecting

specimens, the purpose, process and matters needing attention of specimen collection should be explained to patients in detail to avoid the influence of patients' wrong understanding on the accuracy of test results [2].

3.3 Summary

To sum up, in clinical examination, the accuracy of test results is very important, which directly affects the treatment effect of patients' illness and is a link that must be paid attention to in clinical medical work. The accuracy of test results is influenced by many factors, such as patients' own factors and laboratory factors. In the process of specimen collection, in order to improve the accuracy of test results, the following points should be done well: ① Fully inform patients. ② Fully understand the patients' diet, exercise and other living habits. When collecting specimens, we should explain to patients the purpose of collecting specimens, matters needing attention and the influence of diet, exercise and other living habits on the test results. ③ Strengthen the training of inspectors. When collecting specimens, we should strictly implement the relevant regulations and operating procedures, and strengthen the professional ethics education for inspectors. ④ Establish perfect management system and rules and regulations. Strengthen the supervision and management of all links in the collection of clinical laboratory specimens, and find problems in time and deal with them. ⑤ When collecting specimens, the specimens should be inspected and processed in time.

4 training inspectors to improve their professional quality

In order to make inspectors competent for their work, hospitals should regularly train inspectors to master more professional knowledge and improve their professional quality. When training inspectors, we should consider their actual situation and pay attention to the combination of theory and practice. Through training, they can master more professional knowledge, thus improving their professional quality. Attention should be paid to the following points during training:

(1) Select professional inspectors. Professional inspectors not only have rich theoretical knowledge, but also have rich practical experience. Therefore, selecting professional inspectors for training can improve the efficiency of inspectors and shorten the inspection time.

(2) Pay attention to the combination of theory and practice. When training inspectors, we should pay attention to the combination of theory and practice, which can not only improve the efficiency of inspectors, but also effectively improve their professional quality. Only by combining theoretical knowledge with practice can we better understand what we have learned, thus improving work efficiency. In the study of practical experience, we should pay attention to the combination of theoretical knowledge and actual situation, and sum up the correct inspection methods and standards through continuous practical experience, so as to improve the inspection efficiency.

(3) Training in various forms. When training inspectors, it is necessary to formulate corresponding training programs according to their own actual conditions and adopt various forms of training, such as: ① training in the form of lectures: this training is mainly aimed at inspectors with less experience or without professional training, and experts can be invited to give lectures to teach them some knowledge and skills about inspection; ② Training in the form of group discussion: in this form, people from different majors can participate together to discuss their own problems, which will not only deepen their understanding, but also enable them to learn more useful knowledge; ③ Training in the form of individual self-study: People from different professional fields can be involved in individual self-study, which will not only enable them to exchange learning experiences with each other, but also promote mutual progress [3].

(4) Pay attention to mental health education for inspectors. Only when inspectors have a good attitude can the work be carried out more smoothly. In the work, if the inspectors encounter difficulties, they should communicate with them in time to solve the problems in time, and at the same time, they should be psychologically counseled in time so that they can maintain a good and optimistic attitude to face the difficulties and setbacks encountered in their work.

5 Conclusion

To sum up, there are many factors that will affect the test results in the process of collecting clinical test specimens. In order to improve the quality of collecting clinical test specimens, medical personnel need to analyze the problems and reasons in the process of collecting clinical test specimens, and put forward corresponding solutions according to these problems. First of all, medical staff should strengthen their understanding of the importance of clinical laboratory specimen collection and fully understand the influence of specimen collection on clinical laboratory results. Secondly, medical staff should make full preparations before collecting clinical test specimens, including improving instruments and equipment, testing items, quality control and so on. Finally, medical staff should operate in strict accordance with the requirements of relevant specifications when collecting clinical test specimens, strengthen the

understanding of patients' condition and master the changing law of patients' condition. To sum up, only medical staff can fully realize the problems and reasons in the process of collecting clinical laboratory specimens and take reasonable and effective measures to solve them, can we improve the quality of collecting clinical laboratory specimens and provide patients with more accurate and reliable test results.

About the author: Li Zhihui, female (1986.9—), majoring in biochemistry and molecular biology, Zibo 148 Hospital, deputy director of clinical laboratory and technician in charge.

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