

EFFECTIVENESS OF SANHUANG JIANCHI DECOCTION COMBINED WITH CONVENTIONAL WESTERN MEDICINE THERAPY FOR CHRONIC PERIODONTITIS AND ITS EFFECT ON ADVERSE REACTIONS INCIDENCE AND RECURRENCE

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ABSTRACT

Objective: To explore the effectiveness of Sanhuang Jianchi decoction combined with conventional western medicine therapy in treating chronic periodontitis and analysis its effect on adverse reactions incidence and recurrence.

Methods: 96 patients with chronic periodontitis who met the study standards and admitted to our hospital from June 2019 to December 2020 were selected as the research object and randomly divided into the control group and the experimental group, with 48 cases in each group. The routine western medicine therapy was given to the control group and the Sanhuang Jianchi decoction was given on this basis to the experimental group to evaluate the efficacy of the two groups after treatment.

Results: The treatment effect of the experimental group was significantly better than that of the control group, with a significant difference; compared with the control group, the experimental group obtained obviously lower scores on traditional Chinese medicine (TCM) symptoms including gingiva bleeding, bleeding from gum, dry mouth, halitosis, constipation and yellowish urine; the inflammatory factor levels, probe depth (PD) values, attachment loss (AL) values and bleeding index (BI) values after treatment of patients in the two groups were significantly lower than those before treatment, and those of the experimental group were significantly lower than those of the control group; no adverse reactions occurred in patients of both groups during treatment, and the recurrence rate in the control group at 3 months of follow-up was significantly higher than that in the experimental group ($P < 0.05$), which was statistically significant.

Conclusion: Conventional western medicine therapy combined with Sanhuang Jianchi decoction has a good effect in treating chronic periodontitis, which can effectively improve the adverse clinical symptoms in patients and suppress the inflammatory reactions in the gingival crevicular fluid; in addition, no adverse reactions occur during treatment and the recurrence rate is low, indicating that it is more safe.

Keywords: Chronic periodontitis, Sanhuang Jianchi decoction, conventional western medicine therapy, recurrence rate.

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Introduction

Periodontitis is an oral disease that forms as a result of the spread of gingival inflammation to the periodontium, and chronic periodontitis is one of the most common types with an incidence that accounts for approximately 95% of periodontitis⁽¹⁻⁴⁾. Clinical studies have found that gingivitis can be gradually converted into periodontitis, and since periodontitis has unapparent early symptoms and consequences

that are far more severe than those of gingivitis, early therapeutic intervention for periodontitis is very important⁽⁵⁻⁸⁾. The treatment of chronic periodontitis in the clinic is usually to first clear the irritants such as dental plaque or calculus, then do anti-inflammatory treatment to promote the regeneration of periodontal tissue, and finally, maintain the long-term and stable efficacy. To achieve a better treatment effect, a series of comprehensive treatment measures are usually required, but conventional anti-inflammatory or

antibiosis treatment will make patients develop drug resistance soon. In traditional Chinese medicine (TCM), chronic periodontitis is considered to result from spleen-stomach disharmony and liver and kidney deficiency, which mainly presents the deficiency heat syndrome, so it should be treated primarily by nourishing kidney and fixing teeth, supplemented by eliminating heat by nourishing yin⁽⁹⁻¹²⁾. Related studies have shown that there is no direct treatment of TCM for clearing dental plaque and calculus, and thus the biological basis for treating periodontitis does not exist, however, Sanhuang Jianchi decoction, a TCM formula for clearing heat, detoxification, and eliminating swelling and pain, has the effect of enhancing the periodontal tissues.

Based on this, the actual efficacy of Samhuang Jianchi decoction combined with conventional western medicine therapy in treating chronic periodontitis was explored and its effect on the incidence rate of adverse reactions and recurrence rate was analyzed in this study to provide a new research direction for the treatment scheme of chronic periodontitis in the clinic.

Materials and methods

General information

96 patients with chronic periodontitis who met the study standards and admitted to our hospital from June 2019 to December 2020 were selected as the research object and randomly divided into the control group and the experimental group, with 48 cases in each group. After examining the difference in the patients' basic information between the two groups, it was concluded that there was no statistical difference ($P>0.05$), so the comparative study was workable. See Table 1.

Index	Control group (n=48)	Experimental group (n=48)	t/X ²	P
Age (years old)	47.6±3.2	48.1±3.5	0.6994	0.4862
BMI (kg/m ²)	22.6±1.4	22.1±1.1	1.8628	0.0659
Course of disease (years)	1.6±0.4	1.5±0.3	1.3266	0.1881
Gender			0.1714	0.679
Male	27 (56.25%)	29 (60.42%)		
Female	21 (43.75%)	19 (39.58%)		
Severity			0.1742	0.676
Mild to moderate	30 (62.5%)	28 (58.33%)		
Severe	18 (37.5%)	20 (41.67%)		

Table 1: Comparison of patients' basic information between the two groups.

Inclusion criteria

- Patients met the clinical diagnosis standards for chronic periodontitis;
- Patients had no less than 20 teeth in the mouth;
- Patients had complete clinical medical records and relatively higher compliance;
- The study was approved by the Hospital Ethics Committee and patients and their family members signed the informed consent.

Exclusion criteria

- Patients had serious brain, heart, kidney, liver and other organic diseases;
- Patients had infectious diseases;
- Patients had cognitive disorder, communication disorder or movement disorder;
- Patients were lactating or pregnant women.

Methods

According to the disease condition, all patients were given periodontal non-surgical treatment, mainly including the complete periodontal cleaning, inhibition of dental plaque, periodontal curettage, root face leveling after tooth polishing for 1 week, periodontal index examination after treating for 2 weeks, maintenance treatment and oral hygiene guidance⁽¹³⁻¹⁶⁾.

In addition, patients orally took the metronidazole tablets, (specification: 0.2g/capsule; manufacturer: Sichuan Kelun Pharmaceutical Co., Ltd.;) after meal, with one capsule each time, and three times a day.

On this basis, patients in the experimental group took the Sanhuang Jianchi decoction additionally, which contained 24 g of prepared rehmannia root, 12 g of common yam rhizome, 9 g of tuckahoe, 9 g of oriental waterplantain tuber, 9 g of tree peony root-bark, 6 g of rhubarb, 6 g of amur corktree bark, and 6 g of common anemarrhena rhizoma.

For patients with gastropyloric steam, 6 g of plaster and 8 g of fructus forsythiae were added; for patients with deficiency of qi and blood, 10 g of mongolian milkvetch root was added; and for patients with kidney yin deficiency, 9 g of drynaria rhizome and 6 g of barberry wolfberry fruit were added.

The materials were decocted with water into 300 ml of liquid, which was considered as a dose.

Patients took one dose a day, with 150 ml in the morning and 150 ml in the evening, and both groups were treated for one month.

Observation indexes

Treatment effect

If the patient's adverse symptoms basically disappeared, with no periodontal pocket, unabsorbed alveolar bone, and PD reduction not more than 2 mm, it was considered markedly effective; if the patient's symptoms were improved, with no periodontal pocket and a 1 mm reduction in PD, it was considered effective; and if the patient's symptoms were not improved significantly or aggravated, with absorbed alveolar bone and periodontal sore, it was considered ineffective. Total effective rate = (effective rate + markedly effective rate)/total * 100%.

TCM symptom scores

Patients' gingiva bleeding, bleeding from gum, dry mouth, halitosis, constipation and yellowish urine were scored, with 3 points, 2 points, 1 point and 0 point indicating severe, moderate, mild and none symptom, respectively. The maximum score was 18 points, with lower scores indicating lighter symptoms.

Inflammatory factor level

The levels of inflammatory factors including tumor necrosis factor- α (TNF- α), interleukin-1 β (IL-1 β), interleukin-17 (IL-17) and interleukin-23 (IL-23) in the gingival crevicular fluid were examined by the ELSA method.

Probing depth (PD)

Six sites near the buccolingual side were examined by the lifting-plugging probe method and the PD values were recorded.

Attachment loss (AL)

The periodontal probe was extended into the gingival sulcus to a depth of no less than 3 mm for AL detection.

Gingival bleeding index (BI)

The periodontal pocket was lightly probed with a periodontal probe, and 30 s after the removal of the probe, the bleeding was observed and recorded on the lingual and buccal sides to calculate BI.

Adverse effect incidence and recurrence rate

Patients' adverse effects during treatment were observed, and the patients were finally followed up for three months to count the recurrence of both groups.

Statistical processing

In this study, the data processing software was SPSS20.0, the picture drawing software for the data was GraphPad Prism 7 (GraphPad Software, San Diego, USA), items included were enumeration data and measurement data, methods used were χ^2 test, t-test and normality test, and differences were considered statistically significant at $P < 0.05$.

Results

Between-group comparison of treatment effect

The treatment effect of the experimental group was significantly better than that of the control group, with a significant difference ($P < 0.05$). See Table 2.

Group	Ineffective	Effective	Markedly effective	Total effective rate
Control group (n=48)	9 (18.75)	21 (43.75)	18 (37.5)	39 (81.25)
Experimental group (n=48)	2 (4.17)	19 (39.58)	27 (56.25)	46 (95.83)
χ^2				5.0310
P				0.025

Table 2: Comparison of patients' treatment effect between the two groups [n(%)].

Between-group comparison of TCM symptom scores

Comparing with the control group, the experimental group obtained significantly lower scores on TCM symptoms ($P < 0.05$), including gingiva bleeding, bleeding from gum, dry mouth, halitosis, constipation and yellowish urine, with statistical significance (see Figure 1).

Between-group comparison of inflammatory factor levels

The levels of inflammatory factors such as TNF- α , IL-1 β , IL-6 and IL-8 after treatment were significantly lower than those before treatment, and those of the experimental group were significantly lower than those of the control group ($P < 0.05$), with statistical significance (see Table 3).

Between-group comparison of PD

The patients' PD values after treatment were lower than those before treatment, and those of the experimental group were obviously lower than those of the control group, with statistical significance (see Figure 2).

Between-group comparison of AL

The AL value of the experimental group after treatment was significantly lower than that of the control group before and after treatment, with statistical differences (see Figure 3).

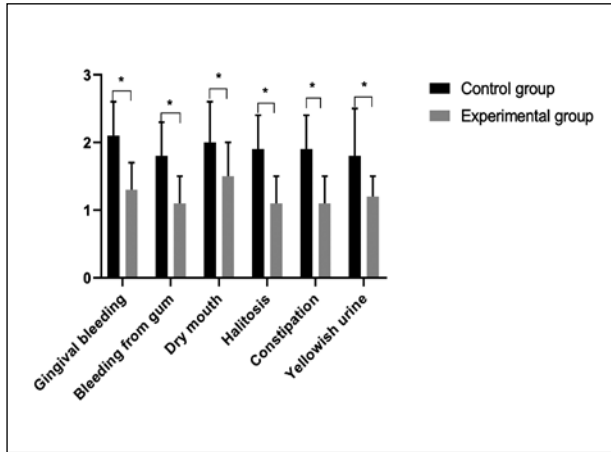


Figure 1: Comparison of patients’ TCM symptom scores between the two groups ($\bar{x} \pm s$).

Note: The horizontal axis indicated the evaluation dimensions, including gingiva bleeding, bleeding from gum, dry mouth, halitosis, constipation, and yellowish urine, and the vertical axis indicated the scores (points). The scores on gingiva bleeding, bleeding from gum, dry mouth, halitosis, constipation and yellowish urine of the control group was (2.1±0.5), (1.8±0.5), (2.0±0.6), (1.9±0.5), (1.9±0.5) and (1.8±0.7), respectively. The scores on gingiva bleeding, bleeding from gum, dry mouth, halitosis, constipation and yellowish urine of the experimental group was (1.3±0.4), (1.1±0.4), (1.5±0.5), (1.1±0.4), (1.1±0.4) and (1.2±0.3), respectively. *from left to right indicated the differences in scores on gingiva bleeding, bleeding from gum, dry mouth, halitosis, constipation and yellowish urine between the two groups were significant (t=8.6560, 7.5740, 4.4353, 8.6560, 8.6560, 5.4583, and P=0.000 in all cases).

Index	Control group (n=48)		Experimental group (n=48)	
	Before	After	Before	After
TNF-α (ng/ml)	5.33±1.65	4.25±1.03 ^a	5.37±1.55	3.11±1.01 ^{ab}
IL-1β (pg/ml)	8.86±2.03	6.24±1.37 ^a	8.83±1.98	3.32±1.01 ^{ab}
IL-17(pg/ml)	8.54±1.95	6.01±1.22 ^a	8.55±1.87	4.17±1.15 ^{ab}
IL-23(pg/ml)	10.86±2.97	6.25±1.17 ^a	10.85±3.02	4.13±1.04 ^{ab}

Table 3: Comparison of patients’ inflammatory factor levels before and after treatment between the two groups ($\bar{x} \pm s$).

Note: Letter “a” indicated P<0.05 when comparing the levels before and after treatment, and letter “b” indicated P<0.05 when comparing the levels between the control group and the experimental group.

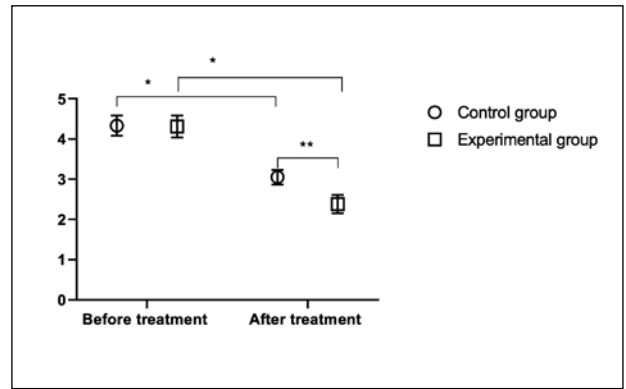


Figure 2: Comparison of patients’ PD between the two groups ($\bar{x} \pm s$).

Note: The horizontal axis indicated before and after treatment, and the vertical axis indicated PD in mm. The PD value before and after treatment of the control group was (4.33±0.25) and (3.05±0.18), respectively. The PD value before and after treatment of the experimental group was (4.31±0.27) and (2.38±0.23), respectively. *from left to right indicated that the differences in PD values before and after treatment between the control group and the experimental group were significant (t=28.7871, 37.6997, P=0.000 in all cases). **indicated that the difference in PD values after treatment between the two groups was significant (t=15.8935, P=0.000).

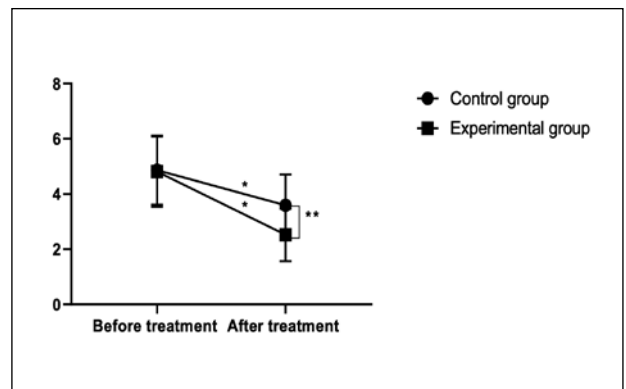


Figure 3: Comparison of patients’ AL between the two groups ($\bar{x} \pm s$).

Note: The horizontal axis indicated before and after treatment, and the vertical axis indicated AL in mm. The AL value before and after treatment of the control group was (4.86±1.25) and (3.59±1.12), respectively. The AL value before and after treatment of the experimental group was (4.81±1.27) and (2.52±0.95), respectively. *from top to bottom indicated that the differences in AL values before and after treatment between the experimental group and the control group were significant (t=5.2425, 10.0035, P=0.000 in all cases). **indicated that the difference in PD values after treatment between the two groups was significant (t=15.8935, P=0.000).

Between-group comparison of gingiva BI

The patients’ BI values after treatment of the two groups were lower than those before treatment, and those of the experimental group were significantly lower than those of the control group, with statistical differences (see Figure 4).

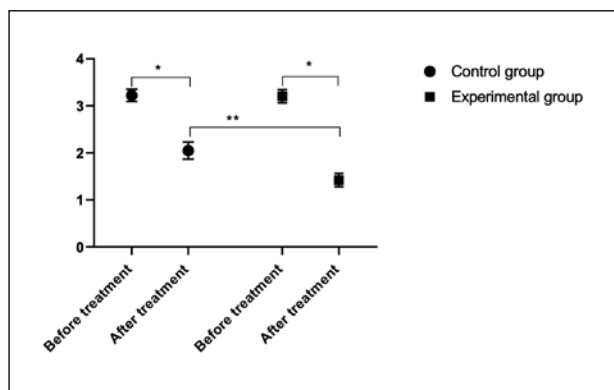


Figure 4: Comparison of patients' BI between the two groups ($\bar{x} \pm s$).

Note: The horizontal axis indicated before and after treatment, and the vertical axis indicated BI. The BI value before and after treatment of the control group was (3.22 ± 0.13) and (2.05 ± 0.18) , respectively; The BI value before and after treatment of the experimental group was (3.20 ± 0.14) and (1.42 ± 0.14) , respectively; *from left to right indicated that the differences in BI values before and after treatment between the control group and the experimental group were significant ($t=36.5076$, 62.2870 , $P=0.000$ in all cases). **indicated that the difference in BI values after treatment between the two groups was significant ($t=19.1408$, $P=0.000$).

Between-group comparison of adverse reaction incidence rates and recurrence rates

No adverse reactions occurred in patients of both groups during treatment, and after 3 months of follow-up, the recurrence rate of the control group and the experimental group was 18.75% (9/48) and 4.17% (2/48) respectively, with a significant difference ($t=5.0310$, $P=0.025$).

Discussion

Periodontitis is a chronic infectious inflammation with the clinical features including the formation of periodontal pockets, periodontal pyorrhea and loose teeth, and if the early prevention and treatment are not carried out in time, the inflammation will gradually spread from the gingiva to the cement, periodontal membrane and alveolar bone, and then form periodontitis⁽¹⁷⁻²⁰⁾.

In clinical treatment, plaques and dental calculus are regarded as "the initiators" of chronic periodontitis. Therefore, western medicine therapy usually remove the irritants first and then inhibit the inflammatory response by antibiotics treatment, so as to accelerate the recovery of periodontal tissue function. However, such therapy is not suitable for long-term treatment, because basic treatment of chronic periodontitis makes the periodontium smooth and forms a bio-compatible root surface that

attaches to the periodontium. Traditional Chinese medicine (TCM) holds that the root causes of patients with chronic periodontitis are the deficiency of body fluid and the stomach fire ascending, usually presenting as swelling and heat-pain of gingiva accompanied by a large amount of bacterial breeding, and on the other hand, as the bones and teeth are nourished by the pneuma of the kidney, so the teeth will not be shed if the pneuma of the kidney is sufficient⁽²¹⁻²⁴⁾. In this study, the treatment effect of the experimental group was significantly higher than that of the control group, with a significant difference; the scores on TCM symptoms including gingiva bleeding, bleeding from gum, dry mouth, halitosis, constipation and yellowish urine were significantly lower than those of the control group; the inflammatory factor levels, PD values, AL values and BI values after treatment of the two groups were significantly lower than those before treatment, and those of the experimental group were significantly lower than those of the control group; no adverse reactions occurred in patients of both groups during treatment, and the recurrence rate of the control group was significantly higher than that of the control group at 3-month follow-up. The results showed that the combination of TCM with western medicine had better effect than using western medicine alone, which was mainly because that the Sanhuang Jianchi decoction could clear away heat and promote blood circulation to remove blood stasis.

Among the materials in the decoction, the prepared rehmannia root could nourish kidney yin and fill essence, the common yam rhizome had the effect of nourishment and building up strength, the tuckahoe could invigorat the spleen and remove the dampness, the oriental waterplantain tuber could remove dampness and promote diuresis, the tree peony root-bark had the efficacy of promoting blood circulation to remove blood stasis, the rhubarb and amur corktree bark could purge fire, cold the blood, and clear away the heat, and the common anemarrhena rhizoma could relieve fever, hence the Sanhuang Jianchi decoction worked well in assisting the western medicine in treating the chronic periodontitis with all the effects combined. Conventional therapies in western medicine could treat the periodontal conditions rapidly, and Sanhuang Jianchi decoction consolidated the function of periodontal tissues by conditioning the whole body, so the overall therapeutic effect was improved. The results of this study were consistent with the conclusions of Anshuka A. Agrawal⁽²⁵⁾ and

others in the literature, which were expressed as follows. The TCM components with the functions of clearing heat and eliminating dampness in Sanhuang Jianchi decoction exerted better bacteriostatic and hemostatic effects and inhibited the secretion of neutrophils *in vitro*; in addition, the TCM formula also regulated the endocrine secretion of patients, improved the body immunity, inhibited the production of inflammatory factors, and elevated the therapeutic effect of chronic periodontitis.

To sum up, combined administration of Sanhuang Jianchi decoction and conventional western medicine has a better effect on the treatment of chronic periodontitis, and can effectively improve the patients' clinical adverse symptoms and inhibit the inflammatory response in the gingival crevicular fluid; in addition, no adverse effects appear during treatment and the recurrence rate is low, indicating the therapy has higher safety and higher clinical promotion value.

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