

# Clinical Study of Iodine-Glycerol Combined With Weivaguang in the Treatment of Acute Pharyngitis

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**Objective:** To explore the clinical effect of iodine-glycerol combined with Weivaguang in the treatment of acute pharyngitis. **Methods:** A total of 118 patients with acute pharyngitis treated in our hospital from July 2017 to December 2019 were selected as the research object, and they were randomly divided into 59 cases in the control group and the study group by random number table method. The group was given Weivaguang treatment on the basis of the control group, comparing the disappearance time, signs or symptoms score, inflammatory factors [tumor necrosis factor alpha (TNF- $\alpha$ ), C-reactive protein (CRP), interleukin (IL-6)] Level and therapeutic effect. **Results:** The throat disappearance time, throat pain disappearance time, hoarseness disappearance time, and pharyngeal edema disappearance time of the study group were significantly shorter than those of the control group, and the differences were statistically significant ( $P < 0.05$ ). Repeated measurement data analysis of variance showed that the difference in the subject's intra-subject effect was statistically significant ( $P < 0.05$ ), with the group factor as the source and the time factor and group interaction as the source within the subject. There was no statistically significant difference in effect comparison ( $P > 0.05$ ), which shows that the signs or symptoms scores have a tendency to change with time; the sign or symptom scores of the two groups are compared: after 5 days of treatment  $< 2$  days after treatment  $<$  before treatment, the differences are both Statistically significant ( $P < 0.05$ ); before the treatment, there were no statistically significant differences in the signs or symptoms scores between the two groups ( $P > 0.05$ ). After 2 days of treatment and 5 days of treatment, the signs or symptoms of the study group were significantly lower than the control Group, the difference was statistically significant ( $P < 0.05$ ). Before treatment, the levels of TNF- $\alpha$ , CRP, and IL-6 were not statistically significant ( $P > 0.05$ ); after treatment, the levels of TNF- $\alpha$ , CRP, and IL-6 decreased in both groups, and the study group and the control The group comparison was significantly lower, and the differences were statistically significant ( $P < 0.05$ ). The therapeutic effect of the study group was better than that of the control group ( $P < 0.05$ ), and the total effective rate of treatment in the study group was 96.61%, significantly higher than 81.36% of the control group, the difference was statistically significant ( $P < 0.05$ ). **Conclusion:** The application of iodine-glycerin combined with valvaguang in the treatment of acute pharyngitis can effectively shorten the disappearance time of patients' clinically relevant indicators, relieve signs or symptoms, reduce the body's inflammatory response, and improve the therapeutic effect.

**Keywords:** iodine glycerin; Weivaguang; acute pharyngitis; clinical efficacy, pharyngitis Cell

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Acute pharyngitis is a kind of acute inflammation caused by virus, mycoplasma infection, bacteria or physical and chemical stimulation, mainly in the pharyngeal mucosa and submucous tissue, often involving the lymphoid tissue of the pharynx, the onset of the disease is urgent, the patient can feel the hot, dry and slight pain of the pharynx, the symptoms gradually aggravate, and finally the swallowing pain will occur. The incidence of acute pharyngitis is about 5%. If the treatment is not timely, it may develop into chronic pharyngitis, causing adverse effects on the quality of life of patients <sup>1</sup>. At present, there is no specific treatment method for acute pharyngitis. Most of them are treated with local medicine, but the curative effect is different. Iodoglycerol has the function of anti-inflammatory and bactericidal, which can reduce the local swelling and promote the repair of pathological mucosa <sup>2</sup>. Vivar light therapy has the characteristics of rapid onset and good tissue repair effect, which has been paid more and more attention in clinical <sup>3</sup>. In this paper, the patients with acute pharyngitis were studied to analyze the effect of iodine glycerin combined with weivaguang in the treatment of acute pharyngitis. Now the research is reported as follows.

## DATA AND METHODS

### General information

118 patients with acute pharyngitis treated in our hospital from July 2017 to December 2019 were selected as the study objects, including 67 males and 51 females. Inclusion criteria: (1) all patients were diagnosed as acute pharyngitis and met the diagnostic criteria of acute pharyngitis <sup>4</sup>; (2) this study was approved by the medical ethics committee of the hospital; (3) patients signed informed consent. Exclusion criteria: (1) malignant tumors, hematological diseases and other diseases that affect the survival; (2) patients with suppurative tonsillitis and bronchitis; (3) women in pregnancy or lactation; (4) those who are allergic to the study drug; (5) those who quit the study halfway. 59 cases in the control group and 59 cases in the study group were randomly divided into the control group and the study group. The study group included 32 males and 27 females. The average age was  $(44.71 \pm 8.23)$  years, the course of disease was 9-55h, the course of disease was  $(23.21 \pm 4.88)$  H, the weight was

47-83kg, and the average weight was  $(67.41 \pm 7.01)$  kg. In the control group, there were 35 males and 24 females, aged 23-70 years, mean age  $(45.94 \pm 8.19)$  years, course of disease (10-53h), course of disease  $(22.35 \pm 4.03)$  h, weight (45-80kg), mean weight  $(66.92 \pm 6.83)$  kg. There was no significant difference between the two groups in terms of sex, age, course of disease ( $P > 0.05$ ), it has the value of research and comparison.

### Method

All patients should pay attention to avoid smoking and alcohol, spicy and greasy food and drinking water during the treatment. (1) The control group was treated with iodoglycerol (gyzz: h31021302, manufacturer: Shanghai Yunjia Huangpu Pharmaceutical Co., Ltd.), which was applied to the pharynx twice a day. Firstly, the lesion area was wiped with sterile cotton ball, then the new cotton ball was dipped with iodoglycerol, and the water and food were forbidden within 30 minutes after treatment. (2) On the basis of the control group, the study group was treated with vivar light. The treatment wavelength was set at 760-1400nm, the irradiation intensity was set at 308mw / cm<sup>2</sup>, the distance between the instrument and the skin was about 30cm, once for 30min, once a day. The treatment time was 5 days.

### Observation indicators

(1)The disappearance time of the two groups of clinical related indexes was compared, including the disappearance time of pharyngeal itch, pharyngeal pain, hoarseness and pharyngeal edema; (2) the scores of physical signs or symptoms were in accordance with the standards in guiding principles for clinical research of new drugs of traditional Chinese medicine. It includes 3 main syndromes and 4 secondary syndromes. The main syndrome scores are 0 (normal), 3 (mild), 6 (moderate) and 9 (severe), respectively. The second syndrome score was 0 (normal), 1 (mild), 2 (moderate), 3 (severe), and the total score was the sum of all items; (3) the inflammatory factors, including tumor necrosis factor -  $\alpha$  (TNF -  $\alpha$ ), C-reaction protein (CRP), interleukin-6 (interleukin-6), before and after treatment were compared between the two groups, IL-6), the level of inflammatory factors was measured by cytoflex flow cytometry of

Beckman Kurt company; (4) Evaluation standard of therapeutic effect<sup>5</sup>: if the signs or symptoms basically disappear, and the total score is reduced by 95% or more than before the treatment, it will be cured; if the signs or symptoms are significantly improved, and the total score is reduced by 70% or more than before the treatment, but less than 95%, it will be effective; if the signs or symptoms are relieved, and the total score is reduced by 30% or more than before the treatment, but less than 70%, it will be effective; If the signs or symptoms are not improved or aggravated, and the total score is reduced by less than 30% or increased compared with that before treatment, it is invalid.

### Statistical methods

All data were input into SPSS22.0 software for processing and analysis. The results of counting data were expressed in the form of (n, %). Rank sum test was used for the treatment effect of grade data, and  $\chi^2$  test was used for the comparison of total effective rate; The results of measurement data are expressed in the form of mean  $\pm$  standard deviation ( $\bar{x} \pm s$ ), repeated measurement test is used for comparison of different time points, and LSD-t test is used for comparison between two groups. The difference was statistically significant ( $P < 0.05$ ).

## RESULTS

### Comparison of disappearance time of clinical related indexes

The disappearance time of pharyngeal itch, pharyngeal pain, hoarseness and pharyngeal edema in the study group were significantly less than those in the control group ( $P < 0.05$ ). See Table 1.

### Comparison of scores of physical signs or symptoms

The results of ANOVA of repeated measurement data showed that there was statistical significance in the comparison of intra subject effects from time factors ( $P < 0.05$ ). There was no statistical significance in the comparison of intra subject effects from group factors and interaction between time factors and groups ( $P > 0.05$ ). Therefore, the scores of physical signs or symptoms had a trend of changing with time. The results of multiple comparison after ANOVA showed that the scores of physical signs or symptoms in the two groups after 2 days and 5

days of treatment were significantly lower than those before treatment, and the scores of physical signs or symptoms in the two groups after 5 days of treatment were significantly lower than those after 2 days of treatment ( $P < 0.05$ ). There was no significant difference in the scores of physical signs or symptoms between the two groups before treatment ( $P > 0.05$ ); the scores of physical signs or symptoms in the study group were significantly lower than those in the control group after treatment for 2 days and 5 days ( $P < 0.05$ ). See Table 2.

### Comparison of inflammatory factors

There was no significant difference in the levels of TNF -  $\alpha$ , CRP and IL-6 between the two groups before and after treatment ( $P > 0.05$ ); after treatment, the levels of TNF -  $\alpha$ , CRP and IL-6 in the two groups decreased on average, and the difference was statistically significant ( $P < 0.05$ ). See Table 3.

### Comparison of therapeutic effects

The therapeutic effect of the study group was better than that of the control group ( $z = -4.392$ ,  $P < 0.001$ ), and the total effective rate of the study group was 96.61%, which was significantly higher than that of the control group (81.36%) ( $P < 0.05$ ). See Table 4.

## DISCUSSIONS

Although acute pharyngitis is not a critical disease, it usually occurs at the turn of autumn, winter and spring due to the acute onset and obvious pain in the pharynx. Due to the stimulation of bacteria and viruses, the pharyngeal mucosa will have vasodilation, hyperemia and serous exudation, which will cause edema of submucosa and mucosa epithelium, lead to leukocyte infiltration, and cause acute pharyngitis, when lymph nodes are involved, there may be swollen lymph nodes in the neck or pharyngeal lymph follicles, which may cause dry cough, dry throat, sore throat and other symptoms of the patient. In serious cases, it may cause headache, fever and so on<sup>6,7</sup>. For the treatment of acute pharyngitis, aerosol inhalation is often used, mainly due to its rapid onset and less dosage, which can reduce the side effects of drugs<sup>8</sup>. Gao Xiujuan et al.<sup>9</sup> showed that the total effective rate of 3% hypertonic saline combined

with ribavirin and dexamethasone in the treatment of acute pharyngitis was 95.8%, with significant effect. However, atomization inhalation also needs to be combined with other drugs, which may increase the toxicity of drugs and increase the adverse reactions after treatment. In this paper, iodoglycerol combined with vivalguang was used and good results were obtained.

Iodoglycerol is a kind of medicine for external use. The syrup liquid, which is composed of glycerin, iodine and potassium iodide, has the functions of anti-inflammatory and bactericidal. It can reduce the local swelling, make the capillaries in the pathological area proliferate, and improve the microcirculation. At the same time, iodoglycerol can also play a lubricating and astringent effect on the pathological mucosa, with strong moisture absorption, and can promote the repair and regeneration of tissue<sup>10,11</sup>. In addition, iodoglycerol can also inhibit the inflammatory response of acute pharyngitis, reduce the release of inflammatory mediators, improve the symptoms of hematoma, and play a therapeutic effect. Bobyriov, Petrova, Ostrovska, Ryabushko, Kapustianska<sup>12</sup> have carried out a comparative study of iodine glycerin in the treatment of herpetic stomatitis in children. The results showed that 96.7% of the effective rate of lidocaine was obtained by adding iodoglycine, which was significantly higher than 85.0% of lidocaine alone, and the symptoms of fever, headache and herpes disappeared more quickly, and there was no significant increase in adverse reactions. Shuaijianping<sup>13</sup> has carried out similar studies, the results show that the total effective rate of the observation group using lidocaine and iodoglycerol is 89.74%, significantly higher. In addition, fever subsided faster, herpes disappeared faster, and the length of stay in hospital was greatly shortened. Bai<sup>13</sup> also carried out such studies. Based on routine interventions such as antiviral, fluid infusion, antipyretic and anti-infection, this study used iodoglycerol combined with lidocaine in oral smear therapy for children with herpetic stomatitis. The total effective rate was 97.5%, nearly 10 percentage points higher than that of the control group. In the same way, the fever symptoms of children in the observation group improved faster, the herpes subsided faster, and the patients were cured and

discharged earlier.<sup>14</sup> used TGP capsule combined with iodoglycerol to treat patients with recurrent oral ulcer. The results showed that the total effective rate of TGP capsule was significantly higher than that of conventional therapy. The improvement of CD3 +, CD4 +, CD8 +, CD4 + / CD8 +, IL-1, IL-6 and TNF -  $\alpha$  levels after treatment was significantly better. And its analgesic effect is more rapid, ulcer healing faster, pain visual simulation score is significantly lower, suggesting that the treatment effect is more accurate, can more significantly improve symptoms, curb inflammation, improve immune level. Lin, Fan, Lin, Wu, Wu, Chen, Fang, Wu, Wen, Dong<sup>15</sup> once carried out research on patients with secondary oral mucositis during tumor chemotherapy, rinsed their mouths with vitamin complex solution and locally applied Smecta + iodoglycerol mixture. The results showed that the effective rate of the scheme was 88.6%, significantly higher than that of the control group (6.3%). Gajdziok, Tajovská, Bajerová, Chalupová<sup>16,30</sup> have developed the intervention research of recurrent oral ulcer, and applied allicin capsule orally and iodoglycerol externally for patients with recurrent oral ulcer. The results showed that the total effective rate of the scheme was 94.2%, which was significantly higher than that of the control scheme (80.8%). After the treatment, the visual simulation score of pain was improved better, the ulcer area was significantly smaller, the levels of TNF -  $\alpha$ , CRP and IL-8 were significantly lower, and the levels of salivary epidermal growth factor and peripheral blood CD4 + / CD8 + increased more significantly. It is proved that the curative effect is definite, and it can restrain inflammation and promote healing. In this study, the application of iodoglycerol on the lesion area can play a direct anti-inflammatory role, and take advantage of the characteristics of iodoglycerol, such as moistening mucous membrane, non-hydrophilicity, etc., to form a protective film on the lesion area and play a protective role, so as to achieve the purpose of treatment.

Vivar light therapy is a kind of light therapy method. It uses infrared light band and visible light band for treatment. Taking 760-1400nm as the treatment wavelength will not produce strong heat effect on the skin surface, but it can accelerate the local blood circulation, so as to

effectively degrade the metabolites<sup>17,18</sup>. Using vivar light in the pathological area can reduce the local sympathetic nervous tension, relieve the neuroedema and the demyelination reaction of the nerve, and then treat the neuralgia of herpes zoster, relieve the vasospasm, establish a good collateral circulation, improve the nutrition supply of the local tissue, so as to relieve the pain and improve the quality of life of the patients. The luminescent body of vivar light is a halogen light source, which is filtered by Wira system, thus greatly reducing the light that is easy to produce thermal effect on the skin and avoiding the burn on the skin. Only the light wave that can be treated and can be tolerated by the patient is reserved, and has strong penetration, which can reach 7cm under the skin, and has an impact on cell metabolism, especially on the repair and regeneration of deep wounds, so as to achieve the effect of deep inflammation treatment<sup>19,20</sup>. Through reducing pain media such as 5-hydroxytryptamine in the body, vivar light can reduce the excitability of sympathetic nerve, so as to play a role in tissue recovery and pain reduction. Salvatore, Latte, Milano, Grasso<sup>21</sup> have carried out the research on the treatment of periarthritis of shoulder with diabetes mellitus, the treatment plan is to release the hand under the brachial plexus block and use the irradiation of wivarlight. The results showed that the pain score of shoulder joint in the observation group was significantly improved, the range of shoulder joint activity was significantly increased, and the periarthritis of shoulder was significantly relieved. Tao, Wang, Haiqin, Xia<sup>22</sup> once carried out the treatment of periarthritis of shoulder by arthrolysis combined with irradiation of vivar light. The results showed that after 2 weeks of treatment, the improvement of pain visual simulation score was better, the improvement of mallet shoulder joint score was better, and the total effective rate was significantly better. It is suggested that the irradiation can enhance the curative effect, improve the function of shoulder joint, relieve the pain and finally improve the non-specific inflammation of shoulder. Mort, Gabrielli, Coons, Behringer, Layon<sup>23</sup> once carried out clinical research on patients with chronic nonspecific low back pain, and treated such patients with whole body vertical rhythm and irradiation with vivar light, focusing on the

improvement of pain and lumbar function. The results showed that compared with the control group, the improvement of pain visual simulation score was significantly better, and the improvement of waist dysfunction investigation score was more obvious. That is to say, vivar light irradiation can further reduce the chronic nonspecific inflammation of the waist, which is mainly reflected in the greater reduction of pain and the better recovery of waist function. Candong<sup>24</sup> have also carried out related research on the treatment of facial neuritis. In this study, patients with acute facial neuritis and facial paralysis were selected and treated with local irradiation of vivar light on the basis of conventional drug therapy and physical therapy. The results showed that the therapeutic effect of the treatment scheme was significantly better after treatment, and the improvement of house brackmann classification, freehand muscle strength test classification and simple facial nerve function score was more obvious after treatment. Boxman, Russell, Mulder<sup>25</sup> once introduced vivaciclovir in the treatment of herpes zoster. On the basis of conventional penciclovir intravenous drip, the affected area of vivaciclovir was irradiated to observe the comprehensive effect. The results showed that the cure rate of the scheme was significantly better, the time of blister stop germination, scab formation and scab removal was significantly shorter, and the pain visual simulation score after treatment was also significantly better. All of the above suggest that the application of wivarlight in the treatment of herpes zoster can significantly shorten the course of disease, relieve symptoms, enhance the efficacy, and curb the inflammation of nerve injury. Huang, Fan, Xiong, Liao, Hua, Xiang, Li, Jin<sup>26</sup> have carried out a clinical study in the field of stenosing tenosynovitis of styloid process of radius. These patients were treated with extracorporeal shock wave therapy combined with light irradiation. The results showed that the improvement of pain visual simulation score was more significant in the treatment of 2 weeks and 4 weeks, the improvement of wrist joint activity score was better, and the total effective rate was significantly higher after the treatment, and the positive rate of Finkelstein sign was significantly lower. It is suggested that wivarlight treatment also has a significant application advantage in this

kind of tenosynovitis. Hellman, Maietta, Byraju, Park, Liss, Prabhala, Neubauer, Williams, Burdette, Shin <sup>27</sup> have tried to treat the patients with common peroneal nerve injury with vivar light. In addition to conventional drug treatment, physical therapy and functional exercise, the selected patients with common peroneal nerve injury also used local irradiation with vivar light. The results showed that after 8 weeks of treatment, the motor conduction velocity and amplitude of the common peroneal nerve were significantly better, and the improvement rate of the muscle strength classification of the anterior tibial muscle and the long and short peroneal muscles by the free hand method was better, which suggested that the light therapy could significantly promote the recovery of the injured nerve. This is because vivar light can act on endogenous protoporphyrin IX <sup>28,29</sup> in tissue, promote the cell signal transduction of damaged neuron cells, make them synthesize and secrete a large number of repair related chemokines, at the same time, inhibit inflammatory factors, and play an anti-inflammatory role of positive immune regulation. In this study, the disappearance time of pharyngeal itch, pharyngeal pain, hoarseness and pharyngeal edema in the study group were significantly shorter than those in the control group. It can be seen that the combination of iodine glycerin and vivar light treatment can shorten the disappearance time of relevant clinical indicators of patients, so that the relevant symptoms can be quickly relieved. In this paper, the improvement of patients' physical signs or symptoms was evaluated by the scores of physical signs or symptoms. The results showed that the scores of physical signs or symptoms in the two groups were compared: After treatment for 5 days < after treatment for 2 days < before treatment, there was a trend of change with time; after treatment for 2 days, after treatment for 5 days, the scores of physical signs or symptoms in the study group were significantly lower than those in the control group. The results showed that the combination of iodoglycerol and weivaguang could improve the main syndromes (pharyngeal pain, redness of pharyngeal mucosa and uvula, redness of posterior pharyngeal wall) and the secondary syndromes (constipation, fever, thirst, redness along the lateral cord) more effectively than the single use of iodoglycerol. In this study,

after treatment, TNF -  $\alpha$ , CRP, IL-6 water in the two groups decreased on average, and the study group was significantly lower than that in the control group. The results showed that the combination of iodine glycerin and iodine glycerin combined with wivarlight could reduce the inflammatory response of patients, but the combined effect was better than that of the single use. The results of this study also showed that the therapeutic effect of the study group was better than that of the control group, and the total effective rate of the study group was 96.61%, significantly higher than that of the control group (81.36%). It can be seen that the therapeutic effect of iodoglycerol combined with vivar light in the treatment of acute pharyngitis was better than that of the single use of iodoglycerol.

To sum up, the application of iodoglycerol combined with weivarguang in the treatment of acute pharyngitis can effectively shorten the disappearance time of relevant clinical indicators, relieve physical signs or symptoms, reduce the inflammatory response of the body, and improve the therapeutic effect.

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Table 1.  
Comparison of disappearance time of clinical related indexes between the two groups ( $\bar{x} \pm s$ )

group	case s	Disappearance time of pharyngeal itch (d)	Disappearance time of pharyngeal pain (d)	Disappearance time of hoarseness (d)	Disappearance time of pharyngeal edema (d)
Research Group	9	2.64±0.53	2.27±0.46	4.72±0.25	3.52±0.31
Control Group	9	5.25±1.72	3.17±0.47	5.48±0.41	4.56±0.26
T value		11.139	10.512	12.157	19.744
P value		<0.001	<0.001	<0.001	<0.001

Table 2  
Comparison of physical signs or symptom scores of two groups at different time points ( $\bar{x} \pm s$ )

Group	Before treatment	2 days after treatment	5 days after treatment	F 时点	F 组间	F 交互
Research group (59)	21.23±5.84	9.69±2.75 <sup>△</sup>	3.66±0.92 <sup>△▲</sup>	618.916	3.465	3.064
Control group (59)	20.43±6.21	11.47±3.54 <sup>△</sup>	5.46±1.62 <sup>△▲</sup>			
T value	0.741	3.085	7.315			
P value	0.460	0.003	<0.001	<0.001	0.065	0.051

Note: compared with before treatment, <sup>△</sup> P < 0.05; compared with 2 days after treatment, <sup>▲</sup> P < 0.05.

Table 3  
Comparison of TNF- $\alpha$ , CRP and IL-6 levels before and after treatment between the two groups ( $\bar{x} \pm s$ )

index	Group	Before treatment	After treatment	F 时点	F 组间	F 交互
TNF- $\alpha$	Research group (59)	152.93±29.14	92.37±21.04 <sup>△</sup>	554.268	7.500	23.634
	Control (59)	153.61±28.94	113.78±18.07 <sup>△</sup>			
	T value	0.127	5.929			
	P value	0.899	<0.001	<0.001	0.007	<0.001
CRP	Research group (59)	10.89±2.56	3.52±1.05 <sup>△</sup>	831.487	2.780	0.018
	Research group (59)	11.08±3.03	4.42±1.66 <sup>△</sup>			
	T value	0.368	3.516			
	P value	0.714	0.001	<0.001	0.098	0.147
IL-6	Research group (59)	84.34±14.05	54.71±9.89 <sup>△</sup>	608.609	3.930	20.821
	Control group (59)	83.68±13.88	63.30±10.27 <sup>△</sup>			
	T value	0.257	4.628			
	P value	0.798	<0.001	<0.001	0.050	<0.001

Note: compared with the same group before treatment, <sup>△</sup> P < 0.05.

Table 4  
Comparison of therapeutic effects between the two groups (n, %)

Group	cases	Cure	Markedly effective	Valid	Invalid	Total effective
Research group	59	32 (54.24)	17 (28.81)	6 (10.17)	2 (3.39)	57 (96.61)
Control group	59	24 (40.68)	12 (20.34)	10 (16.95)	11 (18.64)	48 (81.36)
Z/ $\chi^2$ value			-4.392			7.002
P value			<0.001			0.008