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Current Status and Progress of Traditional Chinese and Western Medicine Treatments for Xanthelasma

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Abstract: *Xanthelasma, also known as xanthoma, is a common benign lesion of the eyelid skin caused by lipid metabolism disorders. As age increases, the tumor gradually enlarges, significantly affecting facial aesthetics and potentially obscuring vision, leading to psychological burdens for patients. Currently, there are various clinical treatment methods for xanthelasma, including drug injections, surgery, cryotherapy, laser treatment, and medicinal thread moxibustion. This paper reviews the recent developments in both traditional Chinese and Western medicine treatments for xanthelasma.*

Keywords: *Xanthelasma, Treatment, Progress, Traditional Chinese Medicine*

1. Introduction

Xanthelasma is a common benign tumor of the eyelid, often occurring in the inner canthus of the upper eyelid as pale yellow plaques. The incidence rate is approximately 1.1% in females and 0.3% in males[1]. Its complex pathogenesis can cause significant life disturbances for patients. With the continuous advancement of medical science, both traditional Chinese and Western medicine have made significant progress in the treatment of xanthelasma. This paper provides a comprehensive review of the current status and progress of treatments for xanthelasma in traditional Chinese and Western medicine, offering more references for clinical treatment.

2. Clinical Characteristics

Xanthelasma is commonly seen in middle-aged and elderly women and can occur in patients with hereditary hyperlipidemia, diabetes, and other secondary hyperlipidemia conditions. The lesions are often located near the inner canthus of the upper eyelid, sometimes affecting the lower eyelid as well. They usually appear on both sides as soft, flat yellow plaques, slightly raised, and distinctly demarcated from the surrounding normal skin[2].

3. Pthogenesis

The exact pathogenesis of xanthelasma is not fully understood. Western medicine suggests it may be related to hormonal imbalances within the body, such as in conditions like polycystic ovary syndrome and hyperlipidemia, or due to habits like frequent late nights and insufficient sleep, or during menopause. These factors can lead to hormonal disturbances, resulting in abnormal fat metabolism and lipid deposition in the eyelids, causing xanthelasma.

Modern traditional Chinese medicine considers xanthelasma to be caused by phlegm, dampness, and heat obstructing the skin, or spleen deficiency and poor transportation function, leading to water metabolism disorders and lipid accumulation in the skin. Additionally, liver and gallbladder damp-heat, often due to excessive alcohol consumption and a rich diet, may contribute to the condition, leading to lipid accumulation in the skin[3].

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4. Treatment Methods for Xanthelasma

4.1 Local Medication Treatment

4.1.1 Bleomycin

Bleomycin inhibits the synthesis and replication of cellular DNA, affecting cell metabolism and causing cell necrosis. Xu Wenbin et al. [4] retrospectively analyzed 68 patients (126 eyes) treated with bleomycin for xanthelasma. Among them, 122 eyes were cured, achieving a cure rate of 96.8%, with 4 eyes showing effectiveness, resulting in an efficacy rate of 3.2%. All cases experienced varying degrees of eyelid swelling after injection. After 6 to 24 months of follow-up, 4 eyes relapsed. Kong Xiaolu et al. [5] randomly divided 101 patients diagnosed with xanthelasma into a treatment group and a control group, receiving intradermal injections of bleomycin hydrochloride and heparin sodium, respectively. The treatment group showed 99 eyes (94.3%) cured and 6 eyes (5.7%) improved, with 3 eyes (3.0%) relapsing among the cured. The control group had 91 eyes (94.8%) cured and 5 eyes (5.2%) improved, with 2 eyes (2.2%) relapsing among the cured. There was no significant difference in cure, improvement, or relapse rates between the two groups. However, bleomycin required fewer treatments and a shorter cure time. Both groups experienced minor side effects such as eyelid swelling and mild itching after injections.

4.1.2 Heparin Sodium

Heparin sodium, a polysaccharide substance, has anticoagulant properties that promote the release of lipoprotein lipase from tissues, catalyzing the hydrolysis of triglycerides and thus clearing blood lipids. Ye Tinglu et al. [6] treated 108 patients with xanthelasma (259 lesions) using heparin sodium injections once a week, with 4 to 10 treatments based on response. Among them, 139 lesions were nearly cured after an average of 6.67 treatments. The remaining 120 lesions completed 10 treatments, with 75 significantly improved, 33 moderately improved, and 12 slightly improved, achieving a total efficacy rate of 82.63%. Subcutaneous hemorrhage at the injection site occurred in 23 cases, and 32 cases showed varying degrees of pigmentation one week post-injection. Blood routine and coagulation function tests in 38 patients showed no significant abnormalities. Eight lesions mildly relapsed during a three-month follow-up. All patients experienced varying degrees of localized pain without systemic adverse reactions. Zhang Fang et al. [7] compared the clinical efficacy of bleomycin and heparin sodium for treating xanthelasma, with the observation group using bleomycin for 61 cases (120 eyes) and the control group using heparin sodium for 61 cases (119 eyes). The clinical efficacy was similar, with cure rates of 96.67% and 94.96%, respectively. However, the heparin group required more injections (6.59 on average) and had a longer average treatment time (46.13 days) compared to the bleomycin group (38.36 days). Neither group experienced severe adverse reactions such as skin necrosis, infection, ulceration, or scarring.

4.1.3 Trichloroacetic Acid

Trichloroacetic acid (TCA) works by chemically peeling the lesion, causing epidermal necrosis and scabbing, reaching the reticular dermis. Chen Min et al. [8] treated 32 cases (54 eyes) of xanthelasma with TCA cauterization, resulting in brown scabs forming at the lesion site, which fell off after about 7 days, with the skin color returning to normal within a month. Among them, 23 cases (36 eyes) were cured after one treatment, and 19 cases (24 eyes) were cured after 2-3 treatments. The skin showed no significant scarring, with 6 cases (8 eyes) having slight local depigmentation or pigmentation post-treatment, and 2 cases (3 eyes) relapsing during follow-up. Han Shudan et al. [9] compared the clinical efficacy of TCA and cryotherapy in treating xanthelasma, dividing 82 patients into a treatment group (42 cases) using TCA and a control group (40 cases) using cryotherapy. The treatment group's efficacy rate was 95.2%, while the control group's was 72.5%. Both groups experienced temporary swelling, pigmentation, recurrence, and varying degrees of pain, but the TCA group had significantly less pain compared to the cryotherapy group.

4.2 Surgical Treatment

Surgical treatment of xanthelasma is effective and reliable. Different surgical methods are chosen based on the size and location of the lesion. For lesions smaller than 5mm, direct excision can be chosen. For larger lesions, simple surgery combined with flap repair or skin grafting can be used. For patients with associated eyelid laxity, a combination of stepwise excision and eyelid laxity correction surgery can be considered [10-11]. However, surgical treatment also has certain drawbacks, such as a

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higher recurrence rate post-surgery. Some patients may experience complications like eyelid ectropion, incomplete eyelid closure, and muscle overlap post-operation. Choi EJ et al. [12] used modified surgery combined with eyelid reconstruction to treat 8 patients with xanthelasma, with no complications like hematoma, wound infection, or necrosis post-surgery. During follow-up (9.8 months), 2 patients experienced muscle overlap. Yan Juan et al. [13] compared the efficacy of comprehensive therapy and simple surgery in treating xanthelasma. The simple surgery group's overall efficacy rate was 78.26%, with 10 eyes relapsing during follow-up, while the comprehensive therapy group (surgery combined with heparin sodium injections) had an overall efficacy rate of 100%, with no relapses during follow-up.

4.3 Cryotherapy

Cryotherapy uses ultra-low temperatures to damage xanthelasma cells, causing cell necrosis, rupture, and apoptosis. Tang Gongfeng [14] randomly divided 94 patients with xanthelasma into a super-pulsed CO2 laser group and a cryotherapy group to observe clinical efficacy. The laser group had 58 cases, and the cryotherapy group had 36 cases. Three months post-treatment, the super-pulsed CO2 laser group had a cure rate of 74.14% and an adverse reaction rate of 6.90%. The cryotherapy group had a cure rate of 30.56% and an adverse reaction rate of 44.44%, with more severe adverse reactions such as scarring and pigmentation changes occurring in the cryotherapy group.

4.4 Laser Treatment

4.4.1 Super-pulsed CO2 Laser

The super-pulsed CO2 laser is an ablative laser with a wavelength of 10600 nm. It generates high heat in intracellular and extracellular water, finely vaporizing tissue layer by layer for treatment. Pan Liju et al. [15] treated 72 patients with xanthelasma using super-pulsed CO2 laser energy (6-8 J/cm²), achieving a total cure rate of 100%. Among them, 38 cases were cured after one treatment, 27 after two treatments, and 7 after three treatments. One year of follow-up showed no recurrence. Postoperative adverse reactions included varying degrees of burning sensation, mild swelling, and itching. Du Jiajie et al. [16] treated 240 cases of xanthelasma with super-pulsed CO2 laser, removing the lesion tissue layer by layer to normal tissue. After laser treatment, burn ointment and recombinant human basic fibroblast growth factor were applied. The cure rate was 100%, with no recurrence in over six months of follow-up. Some patients had minor scars and pigmentation. Zhan Kui et al. [17] used 1-2 W super-pulsed CO2 laser under local anesthesia for non-contact cauterization of xanthelasma lesions until complete removal. Post-treatment, recombinant human basic fibroblast growth factor was applied until scabs fell off and wounds healed. Among 85 patients (191 lesions), 42 had excellent skin recovery, with soft texture and little to no scarring. 128 had good recovery with slightly hard texture and mild pigmentation. 21 had moderate hypertrophic scars, with no severe hypertrophic scars. Lin Chuan et al. [18] compared the efficacy of fractional erbium laser and super-pulsed CO2 laser in treating xanthelasma. They found that fractional erbium laser had better efficacy, postoperative satisfaction, and lower recurrence rates. Cao Haipeng et al. [19] randomly divided 150 patients into two groups: 75 received pulsed CO2 laser treatment, and 75 received microwave treatment. After two treatments, the cure rate was 100% in the pulsed CO2 laser group and 60.0% in the microwave group. Six-month follow-up showed a lower recurrence rate in the pulsed CO2 laser group.

4.4.2 Fractional Erbium Laser

The fractional erbium laser forms thermal damage areas in a matrix pattern, promoting collagen regeneration, improving skin texture, removing fine wrinkles, and promoting pigment decomposition. Zhu Liting et al. [20] treated 92 cases of xanthelasma with fractional erbium laser, with 65 cases resolving after one treatment, 17 cases after two treatments, and 10 cases after three treatments. Three cases had temporary pigmentation. No recurrence was observed during six months of follow-up. Miao Yuanxin [21] compared the cosmetic effects of fractional erbium laser and super-pulsed CO2 laser in treating xanthelasma. They treated 69 cases (98 lesions) with fractional erbium laser (38 cases, 51 lesions) and super-pulsed CO2 laser (31 cases, 47 lesions). The fractional erbium laser group had lower scores for residual tumors, scar depression, pigment abnormalities, and comprehensive efficacy at 3 and 6 months post-treatment, indicating better cosmetic results.

4.4.3 Er:YAG laser

laser, with a wavelength of 2940 nm, is an ablative laser. Its wavelength is at the peak absorption of

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water, causing rapid heating of the superficial skin. The pulse width (300 μs) is shorter than the skin's thermal relaxation time, minimizing thermal damage to surrounding skin, thus precisely vaporizing tissue with minimal thermal damage. Wang Wei et al. [22] treated 47 patients with Erlaser (frequency 10-15 Hz, pulse width 300 μs, spot diameter 1-5 mm, energy output 300-450 mJ). Six-month follow-up showed 43 cases completely resolved without recurrence, scarring, or pigmentation. Two cases had surgical treatment for recurrence, and two had changes in skin texture. Abdelkader and Alashry [23] compared Erlaser and argon laser in treating 40 patients with xanthelasma. Both had similar efficacy, with 2 cases of mild pigmentation in the Ergroup. Both lasers had no intraoperative complications, with Erbeing more suitable for larger lesions. Xiang Fang et al. [24] treated 268 outpatients with xanthelasma using 2940 nm Erlaser (energy density 5-15 J/cm², coagulation depth 60-80 μm, spot overlap <20%) and 35% TCA. After 2-4 treatments, the Erlaser group had a cure rate of 70.45% and an efficacy rate of 100%. The TCA group had a cure rate of 57.6% and an efficacy rate of 96.23%. Both methods caused temporary pain and swelling, with less pain and swelling in the Ergroup. No pigmentation, reduction, or scarring was observed, and low-energy multiple treatments controlled adverse reactions.

4.4.4 Q-Switched 1064 nm NdLaser

Q-switch 1064 nm Nd:YAG is a non-stripping laser that uses peak power light waves to instantly burst the pigment particles of the target matrix under heat, minimizing the damage to surrounding tissues.

Li Xelun et al. [25] used Q-switched 1064 nm Nd:YAG laser to treat 38 patients with blephloxanoma (68 lesions in total). The energy density is 8.3J /cm2, the frequency is 10 Hz, the pulse width is 6 ns, and the spot diameter is 3 mm. Each treatment interval was 2 weeks, and all patients received 1 to 4 laser treatments over 2 to 8 weeks. Results: Among 68 lesions, 70.59% were effective after 1 treatment, 77.94% were effective after 4 treatments, and 32.35% were effective. Among the 38 patients, 2 patients had scar, and the other patients did not have obvious pigmentation, hypopigmentation, ectropion and other adverse reactions.

4.5 Plasma Sublimation Therapy

Plasma sublimation therapy is an electrosurgical, non-ablative technique where RF energy generates plasma from atmospheric gas, creating ionized and mixed compounds that sublimate epidermal tissue. The ion flow does not diffuse into deeper tissues, preserving the basement membrane and preventing heat transfer and surrounding tissue damage. Silvestrs Rubins et al. [26] retrospectively analyzed 27 xanthelasma lesions in 15 patients treated with plasma sublimation (output frequency up to 70 kHz, max output power <2 W). One treatment achieved a 100% lesion clearance rate, with brown scabs forming post-treatment and lasting 7-14 days. After scab removal, normal skin texture returned within a month, with some patients showing mild residual erythema. No scarring or pigmentation changes were observed. A 12-month follow-up showed no scarring, pigmentation, or recurrence. This method is considered easy to control and operate, suitable for periocular use, but has limited studies and reports.

4.6 Traditional Chinese Medicine (TCM) Treatment

TCM believes xanthelasma results from spleen and stomach dysfunction, internal phlegm dampness, and qi-blood stasis. TCM treatments for xanthelasma include fire needle therapy and Zhuang medicine thread moxibustion.

4.6.1 Fire Needle Therapy

Fire needle therapy uses heated needles to pierce lesions, utilizing the heat to unblock meridians and dissolve phlegm, causing the tumor to dry and necrotize. Lin Binbin et al. [27] treated 35 xanthelasma patients with fire needle, achieving an 80.0% cure rate after one treatment, 97.1% after two treatments, and 100% after three treatments. Fire needle therapy was found to be effective, with minimal trauma, quick recovery, and no significant side effects. Tong Xiubing et al. [28] discussed Professor Chen Youyi's experience with fire needle therapy for xanthelasma, supplemented with TCM syndrome differentiation and corresponding herbal treatments. After three treatments, the tumor disappeared.

4.6.2 Zhuang Medicine Thread Moxibustion

Zhuang medicine thread moxibustion is a method of burning one end of the ramie thread soaked

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multiple herbs preparation liquid to form a beadlike charcoal spark, and directly acts on the corresponding points or parts of the patient's body surface to treat diseases.The thread's heat and medicinal properties, combined with acupoint stimulation, promote the body's qi, expel pathogens, and restore the balance of qi and blood. Gong Huizhen [29] observed the clinical efficacy of Zhuang medicine thread moxibustion in treating 50 cases of xanthelasma. Two cases were cured after one treatment, 21 cases after three treatments, 20 cases after five treatments, and 5 cases improved after five treatments. Two cases discontinued treatment after one session.

5. Conclusion

There are various treatment methods for xanthelasma in clinical practice. Whether it is local drug injection, surgical treatment, or laser therapy, each method has its advantages and limitations. The appropriate treatment plan should be selected based on the patient's specific condition. Traditional Chinese medicine (TCM) has unique advantages in treating xanthelasma, but there is a lack of relevant reports and research. It is hoped that future research in TCM can be strengthened to provide more ideas and methods for the treatment of xanthelasma.

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