

Original Research Article

Effect of Mingmu nourishing cream on asthenopia

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Abstract

Purpose: To assess the therapeutic efficacy and safety of Mingmu nourishing cream in asthenopia.

Methods: This study retrospectively analyzed data from 124 patients who were treated for asthenopia in the Affiliated Hospital of Shanxi University of Traditional Chinese Medicine, China from January 2015 to January 2018. Patients were divided into control group ($n = 63$; received conventional eye drops) and study group ($n = 61$; received Mingmu nourishing cream in addition to control group treatment). The ocular symptom scores and tear secretion test (Schirmer's I test (SIT)) were compared between the two groups before and after treatment. Furthermore, the clinical efficacy of Mingmu nourishing cream in the treatment of asthenopia was evaluated.

Results: The differences in SIT, conjunctival congestion classification and ocular symptoms between the two groups after treatment were statistically significant ($p < 0.05$). Moreover, the rate of total therapeutic efficacy in the study group was 86.9 % (53/61), which was significantly higher than the control group ($p < 0.05$).

Conclusion: Mingmu nourishing cream significantly improves symptoms and exhibits favourable tolerability profile. Multi-center large sample study is needed for further verifications of the findings of this study.

Keywords: Mingmu nourishing cream, Asthenopia, Blurred vision

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INTRODUCTION

Asthenopia is a syndrome characterized by intertwined ocular or systemic organic factors as well as psychological factors [1]. Patients usually have obvious self-conscious symptoms, which manifest as ocular pain, eye swelling, burning sensation, foreign body sensation, tearing, photophobia, blurred vision and in severe cases, systemic symptoms such as headache, nausea and vomiting [2]. A previous study reported that in a survey of 260 workers who used video

terminals for a long time, 247 people were found to have subjective symptoms of eye fatigue and discomfort [3].

Treatment regimens for asthenopia include medication, and changing lifestyle habits, amongst others [4]. However, due to the progress of science and technology in modern society and the acceleration of the pace of life, an increasing number of patients with asthenopia show low compliance with the treatment methods above. This presents a challenge in the

treatment of the disease because it cannot be cured by Western medicine alone [5].

With the continuous progress in modern pharmacology, the understanding of the mechanism of action of *Mingmu* nourishing cream has increased. It has been shown that the cream tonifies the liver and kidney, invigorates *Qi* and nourishes the blood, strengthens the spleen, resolves turbidity, brightens the eyes and removes obstacles, which have provided the medical basis for further development and clinical use of the formula [6]. Traditional Chinese medicine applications have been used since ancient times and *Mingmu* nourishing cream (previously used as a decoction) is widely used for the treatment of eye diseases [7]. However, its therapeutic efficacy and safety on asthenopia are still unclear. Therefore, this study aimed to investigate the efficacy of *Mingmu* nourishing cream on asthenopia.

METHODS

Study design

This is a retrospective analysis that collected patients' data admitted to the Affiliated Hospital of Shanxi University of Traditional Chinese Medicine, China from January 2015 to January 2018. The study was approved by the Ethics Committee of the same hospital (approval no. 23LL-31). Subjects were divided into control group (n = 63) and study group (n = 61). All procedures were carried out in accordance with the Declaration of Helsinki [8].

Diagnostic criteria

To ascertain asthenopia in the study subjects, the following diagnostic criteria were examined: causes of asthenopia; inadequate vision, temporary blurred or blurred vision; dry and astringent eyes, itching, tears, burning sensation, swelling pain, blepharospasm; headache, dizziness, memory loss, insomnia.

Inclusion criteria

Patients who met the following criteria were included in the study viz: Patients who were 18 years or older; patients who satisfied all diagnostic criteria for asthenopia based on their medical history and visual examinations; patients who had a normal naked eye vision or corrected vision (distant vision not less than 1.0 or at least one eye not less than 0.8); those who have not used other therapies within the first three months of receiving this therapy and have no adverse reactions; patients who completed duly signed

informed consent forms; and patients whose clinical data was complete.

Exclusion criteria

The following criteria were used to exclude patients from the study: Patients with uncorrected refraction, strabismus, glaucoma, and severe dry eye disease; pregnant or lactating women; patients with serious heart disease, liver disease, encephalopathy, hypertension, and other primary diseases; patients taking other medications that may interfere with the therapeutic effect; patients who had adverse reactions to asthenopia and Sturgeon eye drops; patients with severe cataracts or refractive partials; g. patients who had an eye surgery six months before the start of the study; patients with incomplete clinical data.

Treatments

Patients in the control group received *Heptaphyllum digitalis* in addition to the application of heptaerythrone double glycoside eye drops (Hubei Yuanda Tiantian Pharmaceutical Co. Ltd. (H19993301) into the lower conjunctival sac, one drop three times a day, 10 days as a course of treatment, and a total of 2 courses of treatment. Patients in the study group were treated with *Mingmu* nourishing cream (Recipe: Dendrobium 100 g, Radix Rehmanniae Praeparata 200 g, Radix Achyranthis Bidentata 350 g, Poria 250 g, *Astragalus membranaceus* 200 g, *Rhizoma dioscoreae* 250 g, Rhizoma Polygonati Odorati 200 g, *Fructus lycii* 200 g, Radix et Rhizoma Dioptogonis 120 g, *Schisandra chinensis* 120 g, *Schisandra chinensis* 30 g, *Fructus chastebush* 150 g, Radix Ophiopogonis 120 g, Rhizoma Polygonati Odorati 10 g, *Radix glycyrrhizae* 100 g, cedar 100 g, mulberry seeds 150 g, *Tribulus terrestris* 120 g, hyssop 150 g, zelda 100 g, motherwort 120 g, cassia seeds 300 g, walnuts 200 g, black sesame seeds 150 g, sand nuts 30 g, Colla Corii Asini 300 g, 250 g of rock sugar boiled into a paste, and each time to take 30 g, divided into morning and evening). All patients were treated for 12 weeks.

Evaluation of parameters/indices

Schirmer's, I test (SIT)

The reflexed end of the tear secretion test strip was placed in the outer and middle third of the lower lid conjunctiva. The patient was instructed to close the eyes gently, remove the filter strip after 5 min of testing and read the results of the

test strip. Length of wetting <10 mm was considered abnormal.

The duration of sustained eye use at close range [9]

The subjects were asked to read under prescribed reading conditions and the time from the start of reading to the appearance of any of the symptoms in the diagnostic criteria as well as the point at which the subject showed any discomfort and could not continue reading was recorded as the time of close eye use [9].

Statistical analysis

All data in this study were confirmed by more than two medical staff. Statistical analysis was performed using SPSS 20.0 (SPSS Inc., Chicago, IL, USA). Paired samples t-test between before and after treatment was done in each group. Fischer's exact test was carried out for qualitative data between groups while Wilcoxon's signed rank test between pre- and post-treatment was also conducted in each group. A significant level was set at $p < 0.05$.

RESULTS

Basic clinical characteristics

Among the 124 patients with asthenopia, the age of the patients in the study group was 32 – 83 years, with an average age of (54.05 ± 6.91) years. On the other hand, the age of the patients

in the control group was 32 – 80 years, with an average age of (51.35 ± 7.09) years. There was no significant difference in gender, age, BMI, marital status and disease between the two groups ($p > 0.05$).

SIT index

As shown in Table 2, the differences in the SIT index between the groups were statistically significant ($p < 0.05$) when the pre-and post-treatment values were compared. This indicates that the SIT values increased to different degrees in both groups after treatment than before treatment. The increase in SIT was more prominent in the study group compared to the control group.

Grading of conjunctival congestion

There was a statistically significant difference in the conjunctival congestion between the groups after treatment ($p < 0.05$) indicating that the improvement of conjunctival congestion in the study group was more significant than that in the control group (Table 3).

Clinical therapeutic effect

As shown in Table 4, the total therapeutic efficacy in the study group was 86.9 %, which was significantly higher ($p < 0.05$) than control group (54.0 %). This indicates that the effect of *Mingmu* nourishing cream treatment in the study group was better than the control group.

Table 1: Comparison of clinical data between groups

Item	Control group	Study group	t/ χ^2	P-value
Age (years)	51.35±7.09	54.05±6.91	3.25	0.241
Sex			9.95	0.062
Male	35 (55.6 %)	37 (60.7 %)		
Female	28 (44.4 %)	24 (39.3 %)		
BMI (Kg/m ²)	21.4±2.76	22.7±2.28	1.209	0.332
Smoking	39 (61.9 %)	37 (60.7 %)	1.96	0.591
Marital status			9.95	0.062
Married	19 (30.2 %)	23 (37.7 %)		
Single	12 (19.0 %)	16 (26.2 %)		
Divorced or separated	13 (20.6 %)	12 (19.7 %)		
Widowed	15 (23.8 %)	8 (13.1 %)		
Unknown/missing	4 (6.3 %)	2 (3.3 %)		
Course of disease (years)	5.98±2.98	6.67±2.35	0.287	0.778

Table 2: Comparison of SIT index between groups

Time	Control group	Study group	T	P-value
Before intervention	6.31±2.09	6.67±2.37	0.54	0.272
After intervention	7.39±2.32	9.31±2.89	6.32	0.001
χ^2	7.15	16.91	-	-
P-value	0.001	0.001	-	-

Table 3: Comparison of the grading of conjunctival congestion between groups

Group	None	Mild	Moderate	Severe
Control group	8 (12.7 %)	15 (23.8 %)	25 (40 %)	15 (23.8 %)
Study group	15 (24.6 %)	17 (27.9 %)	25 (41 %)	4 (6.6 %)
<i>T</i>	8.896	11.372	4.578	7.165
<i>P</i> -value	0.043	0.042	0.095	0.014

Table 4: Comparison of clinical therapeutic effect between groups

Parameter	Control group	Study group	χ^2	<i>P</i> -value
Significant effective	13 (20.6 %)	20 (32.8 %)	7.268	0.007
Effective	18 (28.6 %)	33 (54.1 %)	9.737	0.012
Ineffective	33 (52.4 %)	7 (11.5 %)	4.061	0.003
Total effective rate	34 (54.0 %)	53 (86.9 %)	6.378	0.002
<i>T</i>	5.732	4.857	-	-
<i>P</i> -value	0.21	0.13	-	-

Table 5: Comparison of symptom scores between two groups after intervention

Symptom	Group	Occasionally	Often	Always	<i>T</i>	<i>P</i> -value
Blurred vision	Study	22	4	1	-2.187	0.019
	Control	37	7	2		
Diplopia	Study	19	2	0	-2.104	0.025
	Control	30	9	0		
Fear of light and shedding tears	Study	21	1	0	-2.755	0.0005
	Control	40	6	0		
Ophthalmic pain	Study	6	1	0	-2.421	0.005
	Control	32	3	0		
Eye soreness	Study	49	0	0	-2.809	0.015
	Control	42	16	0		
Eye heaviness	Study	29	1	1	-2.370	0.028
	Control	45	6	0		
Dry and foreign body sensation	Study	34	20	0	-2.254	0.014
	Control	24	25	1		
Blepharospasm	Study	10	0	0	-2.354	0.029
	Control	21	7	0		
Non-durable vision	Study	39	9	2	-2.236	0.015
	Control	28	23	7		
Dizziness and headache	Study	17	1	0	-0.695	0.497
	Control	25	1	0		

Symptom score

Table 5 depicts the symptom scores between the control and study groups. There were significant differences ($p < 0.05$) in all the symptoms examined except for the dizziness and headache symptoms, which were not statistically different in both groups ($p > 0.05$).

Total symptom scores

The total symptom scores of the two groups before treatment were not statistically different ($p > 0.05$). However, the differences between the two groups after treatment were statistically significant ($p < 0.001$).

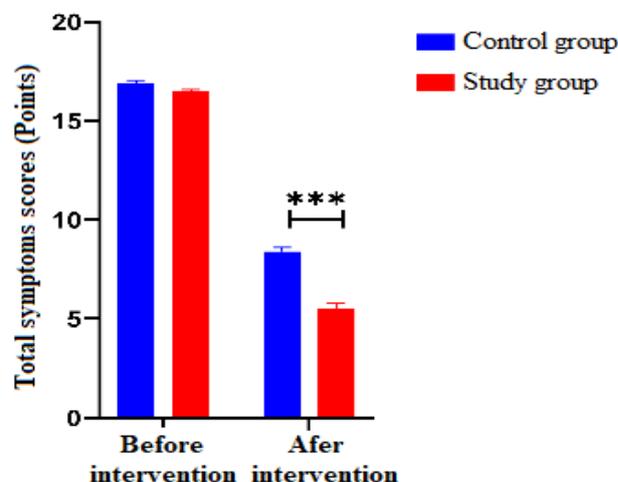


Figure 1: Comparison of total symptom scores between two groups. *** $P < 0.001$ vs. control

DISCUSSION

Asthenopia belongs to the category of "liver strain" and "eye fatigue" in Chinese medicine [10]. Therefore, ancient medical practitioners considered overuse of the eyes, dark depletion of the heart and blood and loss of moistening of the eyes as important etiological mechanisms of the disease [11]. Modern medical practitioners believe that the pathogenesis of this disease is due to overuse of the eyes and constriction of the tendons and veins as well as unrestrained emotions, which prevent the liver *Qi* from harmonizing and relaxing, resulting in *Qi* stagnation and blood stasis. Further reasons include overexertion (which depletes the essence and blood of the liver and kidneys, resulting in fatigue), poor diet (which impairs the transport and transformation function of the spleen and stomach) as well as dysfunction of the internal organs (which results in deficiency of *Qi* and blood and prevents the essence from reaching the head and eyes, resulting in this disease) [12]. The liver is the main organ that facilitates the transmission of *Qi* and blood fluids up to the eyes, which are moistened to be able to discern colors and see objects. Asthenopia occurs as a result of prolonged strain on the eyes, which adversely affects the blood, leading to malnourishment of the eyes and thus asthenopia [13].

Mingmu nourishing cream has the effect of strengthening the spleen and benefiting the *Qi*, nourishing the liver and brightening the eyes. In this study, *Dendrobium* and *Radix Achyranthis bidentata* are used as the major constituents of *Mingmu* nourishing cream. It is believed that when *Qi* moves, blood moves and when *Qi* is strong, blood is generated. The combination of the herbs has the function of tonifying both *Qi* and blood, tonifying without stagnation, tonifying *Qi* and strengthening spleen, nourishing the liver and brightening the eyes. *Dendrobium* is sweet and warm and belongs to the lung and spleen meridians. It is known to tonify *Qi*, strengthen the spleen, raise yang and lift the spleen [14]. Modern studies have shown that *Dendrobium* plays a role in improving immunity and strengthening the heart [15]. *Angelica sinensis*, pungent, sweet and warm, belongs to the heart, liver and spleen meridians, tonifies blood, regulates menstruation, activates blood circulation and relieves pain.

Radix Rehmanniae praeparata and Cassia Seeds are herbs. *Radix Rehmanniae Praeparata* is classified as a member of the liver and kidney meridians. It nourishes the blood, nourishes the yin, benefits the essence and fills the marrow.

Radix Rehmanniae is an important medicine for nourishing the blood and tonifying the kidneys, helping the five viscera to be full of *Qi* and blood and making the ears and eyes bright. Cassia Seeds nourish blood, calm liver yang, astringes yin, and stop pain [16]. The combination of *Radix Rehmanniae praeparata* and Cassia Seeds is effective in tonifying and nourishing the blood, which circulates throughout the body and transfuses upward to the eyes so that the eyes can see clearly because of the blood [17].

Schisandra chinensis and motherwort are the adjuvants in *Mingmu* nourishing cream. *Schisandra chinensis* is pungent and warm, moves *Qi* to dispel wind, invigorates blood and relieves pain, and according to the Compendium of Materia Medica, it "searches liver *Qi*, nourishes liver blood, and increases brightness of the eyes when taken for a long time" [18]. Motherwort moves the head and eyes upward, opens depression in the middle and regulates menstrual blood downward. In combination with *Angelica sinensis*, it moves *Qi*, nourishes and invigorates blood, which not only improves blood flow to the head and eyes but also enables the smooth flow of *Qi* and blood throughout the body [19]. Motherwort is pungent, sweet, and warm and enters the liver, kidney, and spleen meridians, and has the effect of nourishing the liver and brightening the eyes, benefiting the essence and tonifying the kidney. It is good at treating two deficiencies, harmonizing yin and yang, and enriching *Qi* and blood. The entire formula is based on tonifying deficiency, and the combination of the herbs is used to tonify the liver and kidney, benefit the *Qi* and strengthen the spleen, so that both yin and yang, *Qi* and blood are tonified, and the eyes are moistened and the vision is clear [20].

Limitations of this study

This study also has some limitations. First, this study is retrospective. At the same time, because the research population comes from a single hospital, it is difficult to give a general conclusion on the action of the cream. Second, this study did not address the potential mechanism of action of *Mingmu* nourishing cream on asthenopia still needs further study.

CONCLUSION

Mingmu nourishing cream provides an effective treatment for asthenopia thereby providing a new method for the clinical treatment of asthenopia. However, a multicenter, large sample study is needed for further verifications of the findings of this study.

DECLARATIONS

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Ethical approval

None provided.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflict of Interest

No conflict of interest associated with this work.

Contribution of Authors

The authors declare that this work was done by the authors named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by them.

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