Efficacy of acupuncture in improving symptoms and quality of life of patients with acne vulgaris: a randomized sham acupuncture-controlled trial

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Abstract

Objective: The aim of this study was to examine the effectiveness of acupuncture in treating the symptoms and quality of life (QoL) of patients with moderate or severe acne vulgaris (AV).

Methods: Participants were randomly assigned (1:1) to receive 12 treatment sessions of acupuncture or sham acupuncture over 4 weeks with 24 weeks of follow-up. The primary outcome was the change from baseline in the Skindex-16 scale total score at treatment completion. Secondary outcomes included Skindex-16 subscale score, Dermatology Life Quality Index scale total score, total lesion count and inflammatory lesion count, and visual analogue scale scores for itch and pain evaluation.

Results: There was no statistically significant between-group difference for the primary outcome or any secondary outcomes after 4 weeks of treatment and at 16 and 28 weeks of follow-up, except for the Skindex-16 emotions subscale at week 4 (p = 0.026). No serious adverse events occurred in either group.

Conclusion: Acupuncture may not effectively relieve the symptoms of patients with moderate or severe AV, or improve QoL. Given the limitations of a relatively short treatment course compared to other studies and the likelihood that sham acupuncture is not inert, further studies with treatment durations of 12 weeks or longer and a waitlist (no treatment) control or Western medicine-treated control group should be considered to evaluate the effects of acupuncture on AV.

Trial registration number: ChiCTR-1900023649 (Chinese Clinical Trial Registry)

Keywords

acne vulgaris, acupuncture, quality of life, randomized controlled trial

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Introduction

Acne vulgaris (AV) is a chronic inflammatory dermatosis notable for open or closed comedones and inflammatory lesions, including papules, pustules or nodules. AV lesions predominate in exposed areas, such as over the face, chest and back.¹ An epidemiological study of AV identified a prevalence of 9.4% worldwide.² The recurrence of AV lesions on the face may induce feelings of guilt, shame and social isolation. AV also involves other symptoms, such as itching and pain. Such symptoms may affect the physical and mental health of patients, adversely affecting their quality of life (QoL).³–⁷
Conventional Western medical therapy for AV according to the American Society of Dermatology (ASD) clinical guidelines include benzoyl peroxide, topical retinoids or systemic antibiotics, which are recommended as first-line treatment for mild-to-severe AV. However, these therapies may lead to skin drying, peeling, erythema and other related side effects in patients with AV. In addition, long-term use of medicine may lead to drug resistance, which may result in a relatively high recurrence rate of AV. Therefore, natural and safe therapies for AV should also be investigated.

A systematic review concluded that acupuncture could be used as a complementary alternative treatment due to its lower rate of adverse reactions compared with Western medical treatments. An earlier clinical trial suggested that acupuncture might reduce the skin lesions and improve the QoL of patients with AV. However, studies to date have been at high risk of potential bias due to small sample sizes, non-placebo/sham or waiting list controls or use of self-defined outcome measures. Thus, robust evidence of the efficacy of acupuncture for patients with AV remains lacking. Meanwhile, two systematic reviews have recommended using the measure of QoL when evaluating the effect of acupuncture on AV, but so far (to our knowledge) no clinical trials have included any QoL measure to evaluate the effect of acupuncture of patients with AV. The aim of this study was to evaluate the effect of acupuncture compared with sham acupuncture on the symptoms and QoL of patients with moderate or severe AV.

Methods

Study design

This was a prospective, randomized, sham acupuncture-controlled trial with two parallel arms and a 1:1 allocation ratio. The trial was conducted and patients recruited at the Guang’anmen Hospital, China Academy of Chinese Medical Sciences. The trial protocol was approved by the Ethical Committee of the Guang’anmen Hospital (2018-137-KY-01) and registered with the Chinese Clinical Trial Registry (ChiCTR1900023649) on 2 January 2019. The trial protocol has been described in detail elsewhere. The study conformed to the Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) and the STandards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) guidelines. Participants were recruited by advertisements. Before enrollment, all participants provided signed informed consent and were preliminarily screened by research assistants and diagnosed by a dermatologist.

Participants

Participants who met the diagnostic criteria for AV according to the ASD guidelines were included if they were aged 18–48 years with a Global Acne Grading System (GAGS) score between 19 and 38 (where 1–18 points = mild, 19–30 points = moderate, 31–38 points = severe and >39 points = markedly severe AV).

The participants were excluded if they met any of the following criteria: (1) a history of polymerization acne, explosive acne, drug acne, premenstrual acne, cosmetic acne, occupational acne, or any other subtypes of acne or severe diseases that may affect acne, such as polycystic ovary syndrome, thyroid disease, or atypical congenital adrenal hyperplasia; (2) other skin diseases potentially influencing the assessment of AV, such as rosacea or folliculitis; (3) severe heart, liver, kidney, hematopoietic system or autoimmune disorders, or severe systemic malnutrition; (4) pregnancy, lactation or plan to conceive within 12 months; (5) use of antibiotics, retinoic acid, steroids, or anti-inflammatory drugs in the preceding month, or receipt of any treatment in week 4: “Do you think you have received traditional acupuncture?” to assess the blinding effect of sham acupuncture. The response options were “yes,” “no,” or “unclear.”

Randomization, allocation concealment and blinding

The randomization was prepared by the National Clinical Drug Testing Institute of Guang’anmen Hospital using a computerized random number generator. Sealed opaque envelopes were used to ensure allocation concealment. The randomization sequence number and information about group allocation were sealed in ordered envelopes, which were opened according to the patient’s order of entry into the trial. The envelopes were kept by a researcher not involved in the treatment or assessment. The participants, outcome assessors and statisticians were blinded to group allocation; however, acupuncturists were not blinded in this trial due to the characteristics of the acupuncture. Participants were asked to answer the following questions within 5 min of any treatment in week 4: “Do you think you have received traditional acupuncture?” to assess the blinding effect of sham acupuncture. The response options were “yes,” “no,” or “unclear.”

Interventions

The acupuncture regimen was based on the guidelines for AV treatment in China (revised version 2014) and a consensus of experienced acupuncturists. The trial acupuncturists had completed undergraduate education or higher in acupuncture and had at least 2–3 years of experience. Moreover, all researchers received one day of training before participant enrollment. Participants received 12 treatment sessions of acupuncture or sham acupuncture (30 min per session) three times per week for 4 weeks with 24 weeks of follow-up. Participants were encouraged not to receive any other therapies during the study period. However, rescue medications were available to all participants in case of unbearable deterioration of the AV.
condition during the trial, and details of medication use (name, time, frequency and dosage) were recorded.

In the acupuncture group, participants received acupuncture at CV14 (Daizu) and bilateral LI11 (Quechi), LI4 (Hegu), ST36 (Zusanli) and ST44 (Neiting) with disposable acupuncture needles (0.30 mm × 40 mm, Huatuoh Brand; Suzhou Medical Appliance, Suzhou, Jiangsu, China). After routine disinfection, acupuncturists inserted the needles to a depth of 30–40 mm at an angle of 10–15 degrees at CV14, and to a depth of 25–30 mm at the other four traditional acupuncture point locations. All needles were gently manipulated three times (once every 10 min) using slight lifting, thrusting and twisting manipulations to produce de qi sensation (characteristic needling sensation of soreness, numbness, swelling and heaviness).18

In the sham acupuncture group, participants received minimal acupuncture at sham CV14 (10 mm to the left of CV14), sham LI11 (midway between LI11 and LU5 (Chize)), sham LI4 (10 mm from LI4 on the radial side), sham ST36 (midway between ST36 and GB34 (Yanglingquan)) and sham ST44 (midway between ST44 and GB43 (Xiaixi)). At all sham needling locations, acupuncture needles were inserted vertically to a depth of only 1–2 mm without any manipulation or elicitation of de qi.

Outcome measures

The primary outcome was the change in total score of the Skindex-16 scale from baseline at the end of week 4. This scale includes a total of 16 items, which are categorized into 3 domains: symptoms, emotions and functioning of patients with AV. The Skindex-16 scale (range: 0–100, with lower scores representing better QoL) is a brief, skin-associated QoL scale, which has been used to evaluate the effect of acupuncture on QoL of patients with AV.19,20

The secondary outcomes were as follows: (1) change from baseline in Skindex-16 scale total scores at weeks 16 and 28; (2) change from baseline in Skindex-16 subscale (symptoms, emotions, functioning) scores at weeks 4, 16 and 28; (3) change from baseline in the Dermatology Life Quality Index (DLQI); range 0–30, with higher scores representing better QoL31 total scores at weeks 4, 16 and 28; (4) change from baseline in total lesion (inflammatory and non-inflammatory lesions) count (TLC)22,23 at weeks 4, 16 and 28; (5) change from baseline in inflammatory lesion count (ILC)24 at weeks 4, 16, and 28; (6) change from baseline in the degree of itching assessed using theitch Assessment with Visual Analogue Scale (IVAS; range 0–100, with higher scores indicating higher itching intensity)25 at weeks 4, 16 and 28; and (7) change from baseline in the severity of pain assessed by a visual analogue scale (PVAS; range 0–100, with higher scores indicating greater pain)25 at weeks 4, 16 and 28.

The participants’ expectations regarding the acupuncture were evaluated using the following two questions: “Do you think acupuncture will be effective for treating the illness?” and “Do you think acupuncture will be effective for relieving the related symptoms of AV?” The response options were “yes,” “no,” or “unclear.”

Adverse events (AEs) comprised AEs related to the acupuncture and those that were unrelated to the treatment; these were monitored and recorded throughout the trial.

Sample size estimation

We performed a sample size calculation using Power Analysis and Sample Size, version 11.0 based on our primary outcome (change from baseline in Skindex-16 scale score at the end of week 4). In our unpublished pilot trial, the mean ± standard deviation (SD) of the reduction in the Skindex-16 scale score after a 4-week treatment was 12.50 ± 19.09 and 0.40 ± 21.12 in the acupuncture and sham acupuncture groups, respectively. Assuming an alpha risk of 5% (two-sided test) and a beta risk of 20%, and considering a 20% drop-out rate, we estimated that a sample size of 100 (n = 50 participants in each group) would be required.

Statistical analysis

Study data were analyzed according to the intention-to-treat principle. Baseline characteristics were assessed using an independent $t$ test or non-parametric equivalent for continuous variables and the chi-square test for categorical variables. For the between-group differences in Skindex-16 scale total scores, Skindex-16 subscale (symptoms, emotions and functioning) scores, DLQI scores, TLC, ILC, IVAS scores and PVAS scores, data were analyzed using an independent $t$ test (if normally distributed) or non-parametric equivalent. Comparison with baseline data was performed using a paired $t$ test (if normally distributed) or a non-parametric equivalent. Analysis of data pertaining to the participants’ expectations of acupuncture and the blinding assessment was performed using the chi-square test or Fisher’s exact test. Missing data were replaced with the actual observational data without imputation. Continuous variables are presented as the mean with SD or 95% confidence intervals (CIs), while categorical variables are presented as numbers and proportions. Data analysis was performed using SPSS Statistics version 20.0 software (IBM Corp, Armonk, NY, USA). All probability (p)-values were two-tailed, and a $p < 0.05$ was considered to indicate statistical significance.

Results

In this study, 205 patients were screened between August 2019 and August 2020, of whom 105 patients were excluded and 100 patients remained in the trial. These 100 patients were randomized to either acupuncture or sham acupuncture, with 50 in each group. Among the randomized participants,
20 (20%) patients dropped out during the study—9 patients in the acupuncture group (18%) and 11 patients in the sham acupuncture group (22%). Twelve patients withdrew from the study due to perceived lack of efficacy (six patients in each group) and seven patients (two in the acupuncture group and five in the sham acupuncture group) withdrew from the study due to local area outbreaks of COVID-19 and subsequent precautions; for one patient (in the acupuncture group), no reason for drop out was provided (Figure 1). No significant between-group differences were observed in the baseline characteristics of the 100 patients, as shown in Table 1 (p > 0.05 for each item).

On average, participants in the acupuncture and sham acupuncture groups received 11.2 and 10.8 treatment sessions, respectively, and a total of 92% of the participants in the acupuncture group and 88% in the sham acupuncture group received at least 10 (>80%) of the planned treatment sessions.

**Primary outcome**

Differences in the decrease in Skindex-16 scale scores from baseline to week 4 did not differ significantly between the acupuncture group (n = 42) and the sham acupuncture group (n = 39; p > 0.05). The change from baseline in the total score of the Skindex-16 scale after 4 weeks of treatment was −14.37 (95% CI −20.58 to −8.16) in the acupuncture group and −11.09 (95% CI −18.76 to −3.42) in the sham acupuncture group, with a between-group difference of −3.28 (95% CI −12.93 to 6.37), as shown in Table 2.
Table 1. Baseline patient characteristics.

| Characteristics                        | Acupuncture (n = 50) | Sham acupuncture (n = 50) | p value |
|----------------------------------------|----------------------|---------------------------|---------|
| Age (years)                            | 27.0 ± 4.60          | 27.3 ± 6.36               | 0.774   |
| Sex                                    |                      |                           |         |
| Male                                   | 11 (22)              | 9 (18)                    | 0.617   |
| Female                                 | 39 (78)              | 41 (82)                   |         |
| Race                                   |                      |                           |         |
| Han                                    | 49 (98)              | 48 (96)                   | 1.000   |
| Minorities                             | 1 (2)                | 2 (4)                     |         |
| Marital status                         |                      |                           |         |
| Yes                                    | 11 (22)              | 9 (18)                    | 0.617   |
| No                                     | 39 (78)              | 41 (82)                   |         |
| Educational level                      |                      |                           |         |
| Primary education or below             | 0 (0)                | 0 (0)                     | 0.088   |
| Secondary education                    | 12 (20)              | 21 (42)                   |         |
| Tertiary education                     | 38 (80)              | 29 (58)                   |         |
| Body mass index                        | 21.5 ± 2.90          | 23.9 ± 4.65               | 0.480   |
| Frequency of sports activity           |                      |                           |         |
| 0–3 times/month                        | 22 (44)              | 24 (48)                   | 0.533   |
| 1–2 times/week                         | 19 (38)              | 20 (40)                   |         |
| 3–4 times/week                         | 6 (12)               | 4 (8)                     |         |
| ≥5 times/week                          | 3 (6)                | 2 (4)                     |         |
| Daily sleep duration (h)               |                      |                           |         |
| <7                                     | 12 (24)              | 14 (28)                   | 0.543   |
| 7–9                                    | 37 (74)              | 36 (72)                   |         |
| >9                                     | 1 (2)                | 0 (0)                     |         |
| Smoking history                        |                      |                           |         |
| Yes                                    | 3 (6)                | 2 (4)                     | 1.000   |
| No                                     | 47 (94)              | 48 (96)                   |         |
| Drinking history                       |                      |                           |         |
| Yes                                    | 2 (4)                | 4 (8)                     | 0.678   |
| No                                     | 48 (96)              | 46 (92)                   |         |
| AV duration (months)                   | 56.1 ± 52.12         | 56.7 ± 7.30               | 0.956   |
| Global Acne Grading System score       | 24.7 ± 4.94          | 23.9 ± 4.65               | 0.443   |
| Expectations of the effect of acupuncture in general | | | |
| Yes                                    | 32 (64)              | 27 (54)                   | 0.307   |
| No                                     | 1 (2)                | 0 (0)                     |         |
| Unclear                                | 17 (34)              | 23 (46)                   |         |

(Continued)
Table 1. (Continued)

| Characteristics                                      | Acupuncture (n = 50) | Sham acupuncture (n = 50) | p value |
|-------------------------------------------------------|----------------------|---------------------------|---------|
| Positive expectations of acupuncture for AV           |                      |                           |         |
| Yes                                                   | 31 (62)              | 28 (56)                   | 0.685   |
| No                                                    | 0 (0)                | 0                         |         |
| Unclear                                               | 19 (38)              | 22 (44)                   |         |
| Total score of Skindex-16 scale                       | 52.2 ± 20.80         | 49.8 ± 20.49              | 0.576   |
| Skindex-16 symptoms subscale score                   | 32.2 ± 22.32         | 30.9 ± 19.42              | 0.931   |
| Skindex-16 emotions subscale score                   | 70.0 ± 23.51         | 67.0 ± 26.24              | 0.694   |
| Skindex-16 functioning subscale score                | 44.4 ± 30.40         | 41.6 ± 31.76              | 0.661   |
| Dermatology Life Quality Index score                 | 9.8 ± 4.26           | 9.9 ± 4.69                | 0.801   |
| Total lesion count                                     | 32.2 ± 17.44         | 33.89 ± 15.93             | 0.407   |
| Inflammatory lesion count                             | 13.5 ± 7.71          | 12.4 ± 5.43               | 0.675   |
| Itch assessment (VAS)                                 | 27.3 ± 24.02         | 23.3 ± 23.69              | 0.324   |
| Pain assessment (VAS)                                 | 27.0 ± 23.47         | 22.8 ± 25.92              | 0.411   |

AV: acne vulgaris; VAS: visual analogue scale.
Data are mean ± standard deviation or n (%).

Table 2. Primary and secondary outcomes.

| Variable                                      | Acupuncture (n = 42) | Sham acupuncture (n = 39) | Difference (95% CI) | p value |
|-----------------------------------------------|----------------------|---------------------------|---------------------|---------|
| **Primary outcome**                           |                      |                           |                     |         |
| Change from baseline in Skindex-16 scale total score | −14.37 (−20.58 to −8.16) | −11.09 (−18.76 to −3.42) | −3.28 (−12.93 to 6.37) | 0.501   |
| **Secondary outcomes**                        |                      |                           |                     |         |
| Change from baseline in Skindex-16 scale total score | −6.37 (−12.03 to 0.71) | −2.86 (−9.50 to 3.78)    | −3.51 (−12.06 to 5.05) | 0.417   |
| Change from baseline in Skindex-16 symptoms subscale score | −4.13 (−9.86 to 1.32) | −1.29 (−9.15 to 6.57)    | −2.84 (−12.15 to 6.46) | 0.568   |
| Change from baseline in Skindex-16 emotions subscale score | −25.67 (−33.65 to −17.68) | −15.42 (−24.77 to −6.06) | −10.25 (−22.94 to 1.80) | 0.026   |

(Continued)
| Variable Description                       | Acupuncture (n = 42) | Sham acupuncture (n = 39) | Difference (95% CI) | p value |
|--------------------------------------------|----------------------|--------------------------|---------------------|---------|
| Change from baseline in Skindex-16 functioning subscale score |                      |                          |                     |         |
| Week 4\(^{a}\)                            | −9.53 (−15.73 to −3.33) | −7.70 (−17.59 to 2.18)   | −1.82 (−13.14 to 9.48) | 0.212   |
| Week 16\(^{b}\)                           | −3.02 (−11.27 to 5.23)  | 1.19 (−5.94 to 8.33)     | −4.21 (−15.00 to 6.58) | 0.421   |
| Week 28                                    | −2.64 (−11.03 to 5.74)  | −1.75 (−10.75 to 7.24)   | −0.89 (−12.98 to 11.20) | 0.368   |
| Change from baseline in Dermatology Life Quality Index scale score |                      |                          |                     |         |
| Week 4\(^{a}\)                            | −3.47 (−4.64 to −2.31)  | −2.56 (−4.23 to −0.89)   | −0.91 (−2.90 to 1.07)  | 0.224   |
| Week 16\(^{b}\)                           | −1.31 (−3.11 to 0.48)   | 1.67 (−2.53 to 5.87)     | −2.98 (−7.40 to 1.43)  | 0.965   |
| Week 28                                    | 0.71 (−1.29 to 2.70)    | 2.87 (0.43 to 5.31)      | −2.16 (−5.26 to 0.93)  | 0.167   |
| Change from baseline in total lesion count  |                      |                          |                     |         |
| Week 4\(^{a}\)                            | −7.10 (−10.31 to −3.87) | −5.55 (−8.97 to −1.69)   | −1.76 (−6.54 to 3.01)  | 0.070   |
| Week 16\(^{b}\)                           | −8.10 (−11.86 to −4.33) | −7.44 (−10.14 to −4.73)  | −0.66 (−5.27 to 3.94)  | 0.776   |
| Week 28                                    | −9.73 (−14.59 to 4.87)  | −6.71 (−10.28 to −3.16)  | −3.01 (−8.99 to 2.97)  | 0.228   |
| Change from baseline in inflammatory lesion count |                      |                          |                     |         |
| Week 4\(^{a}\)                            | −3.83 (−6.02 to −1.65)  | −1.33 (−3.25 to 0.58)    | −2.50 (−5.38 to 0.38)  | 0.133   |
| Week 16\(^{b}\)                           | −2.92 (−5.53 to −0.32)  | −1.12 (−3.22 to 0.97)    | −1.79 (−5.11 to 1.52)  | 0.636   |
| Week 28                                    | −3.43 (−5.62 to −1.26)  | −2.13 (−4.25 to −0.01)   | −1.31 (−4.30 to 1.68)  | 0.347   |
| Change from baseline in itch assessment (VAS) |                      |                          |                     |         |
| Week 4\(^{a}\)                            | −9.38 (−15.40 to −3.36) | −6.77 (−12.07 to −1.47)  | −2.61 (−10.56 to 5.33) | 0.515   |
| Week 16\(^{b}\)                           | −10.71 (−18.77 to −2.64) | −4.89 (−13.71 to 3.92)  | −5.80 (−17.54 to 5.95) | 0.328   |
| Week 28                                    | −14.98 (−21.91 to −8.04) | −3.82 (−12.66 to 5.02)  | −11.56 (−22.15 to 0.16) | 0.072   |
| Change from baseline in pain assessment (VAS) |                      |                          |                     |         |
| Week 4\(^{a}\)                            | −13.02 (−19 to −7.04)   | −12.79 (−21.35 to −4.24) | 0.23 (−10.38 to 9.93)  | 0.964   |
| Week 16\(^{b}\)                           | −10.44 (−17.71 to −3.16) | −8.51 (−19.34 to 2.32)  | −1.93 (−14.65 to 10.80) | 0.700   |
| Week 28                                    | −12.66 (−19.48 to −5.84) | −7.87 (−17.98 to 2.23)  | −4.78 (−16.67 to 7.10) | 0.547   |

CI: confidence interval; VAS: visual analogue scale.
Analysis was performed following the intention-to-treat principle.
All tests were two-sided. p < 0.05 was considered significant.
Missing values were without imputation.
\(a\)Eight patients in the acupuncture group and 11 patients in the sham acupuncture group dropped out at week 4.
\(b\)One patient in the acupuncture group was lost to follow-up at week 16.

Secondary outcomes

For secondary outcomes, statistically significant differences were observed between the acupuncture and sham acupuncture groups in the change from baseline in the Skindex-16 emotions subscale score at week 4 (p = 0.026) but not at week 16 or week 28 (p > 0.05). Meanwhile, no statistically significant differences were observed between the acupuncture and sham acupuncture groups in the change from baseline in the Skindex-16 symptoms or functioning subscales score, DLQI scale scores, TLC, ILC, IVAS total scores or PVAS scores at any time point (all p > 0.05), as shown in Table 2. No statistically significant difference was observed between the two groups in terms of the success of blinding (p = 0.904; Table 3).

For the safety assessment, 10 patients (6 in the acupuncture group and 4 in the sham acupuncture group) reported AEs during the treatment. In the acupuncture group, three patients from the acupuncture group complained of needle pain after insertion, and three patients also had hematomas in the area of needle insertion. In the sham acupuncture group, four patients complained of skin redness and itching after the intervention. No serious AEs occurred in either group, and none of the patients took rescue medication during the trial.
Compared with the sham acupuncture measure since it represents a sensitive and specific tool to follow-up. The change in the Skindex-29 scale (of which the Skindex-16 scale is a simplified version) scores between participants receiving acupuncture administered at traditional acupuncture point locations only and that administered at both traditional points and ah shi points. In our study, we did not include ah shi points in the verum point prescription and used sham acupuncture as the control group. Sham acupuncture is arguably not inert, and therefore, its use may explain the lack of statistically significant differences between the two groups. Meanwhile, both groups showed a statistically significant decline in the Skindex-16 score by the end of the treatment period. According to a previous pharmaceutical trial in dermatological disease, the difference between active intervention and placebo in the change from baseline in the total score of the Skindex-16 scale ranged from −3.2 to −7.9, and the change from baseline in the total score of the Skindex-16 scale following the active intervention ranged from −7.2 to −18.6. Our study showed that the change from baseline in the total score of the Skindex-16 scale was −14.37 (95% CI −20.58 to −8.16) in the acupuncture group and −11.09 (95% CI −18.76 to −3.42) in the sham acupuncture group after the 4-week treatment. Therefore, acupuncture and sham acupuncture might both result in relief of symptoms and improvement in QoL in patients with moderate or severe AV during the treatment period. However, no statistically significant difference between the two groups was observed, which may reflect the possibility that sham acupuncture has more non-specific, and even specific, biological effects than other types of placebo.

Our study has several limitations. First, this was a single-center study with a relatively small sample size, and patients were recruited only in the Beijing area. Hence, the results of the study are mostly based on specific populations; whether...
or not they can be applied to populations in other regions and nations remains unknown. Second, acupuncture is a complex intervention and the effect of placebo and psychosocial cues are part of the total effect of acupuncture, so a waitlist (untreated) negative control group, or a positive control group treated with Western medicine, may be more appropriate as a reference group for further studies. Third, because of the characteristics of acupuncture, the acupuncturists were not blinded in our trial, a fact which may be a source of potential bias. Fourth, the effect of the relatively high drop-out rate due to the influence of COVID-19 may also have biased the results.

Conclusion

Acupuncture may not effectively relieve the symptoms of patients with moderate or severe AV, or improve QoL, during or following a 4-week treatment period with a total of 12 treatments. Further studies with treatment duration of 12 weeks or longer, and a waitlist (no treatment) or Western medicine-treated control group should be considered in order to evaluate the effects of acupuncture on AV.

Availability of data and materials

All relevant data will be shared from 3 months after publication to 5 years. The datasets used in the present study are available from the corresponding author on reasonable request.

Contributors

ZL and RJ conceived the idea of this trial and designed this study. XZ performed the statistical analysis. RJ, XZ and ZX were responsible for the recruitment and treatment of participants. The manuscript was drafted by RJ and revised by ZL. All authors have read and approved the final version of the manuscript accepted for publication.

Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethical approval and consent to participate

The study protocol was approved by the Institutional Review Board of Guang’anmen Hospital in China (2018-137-KY-01; Supplemental File 1). All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and in line with the Declaration of Helsinki.

Consent for publication

Informed consent was obtained from all the patients who were included in the study.

Supplemental material

Supplemental material for this article is available online.

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