

## ACUPUNCTURE FOR PATIENTS WITH GLAUCOMA

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**Context:** Research of the effects of one acupuncture method for patients with glaucoma, focusing on intraocular pressure (IOP) and visual acuity.

**Objective:** To explore the possibility of using acupuncture for patients with glaucoma.

**Design:** Pilot study utilizing a one-group preintervention, postintervention design.

**Setting:** Eleven patients with glaucoma were recruited through advertisement at the clinic for glaucoma.

**Intervention:** Acupuncture was carried out twice a week over 5 weeks.

**Outcome Measures:** IOP, visual acuity, and subjective symptoms were observed at 15 minutes before and after acupuncture once a week and in a four-week follow-up.

**Results** IOP was significantly improved at 15 minutes after acupuncture, at one week, two weeks, and five weeks and tended to be lower weekly. Uncorrected visual acuity was significantly improved at three weeks, four weeks, and five weeks, and best corrected visual acuity was significantly improved at five weeks. However at the four-week follow-up, significance remained only in uncorrected visual acuity.

**Conclusions:** Although these results should be interpreted cautiously, acupuncture can be used to supplement the conventional therapy for glaucoma.

**Key words:** Acupuncture, glaucoma, intraocular pressure, visual acuity

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## INTRODUCTION

In most cases, glaucoma is a slowly progressive disease. Some patients may seek complementary or alternative medicine (CAM) to supplement their regular treatments.<sup>1</sup> Acupuncture may be potentially useful in treating a variety of ocular conditions including dry eye, myopia, paralytic strabismus, retinitis pigmentosa, optic atrophy, iritis, conjunctivitis, and cataracts. In 1999, the American Academy of Ophthalmology task force acknowledged that acupuncture may be useful as an adjunctive therapy or as an acceptable alternative to conventional treatment for certain ocular conditions.<sup>2</sup> However, at this time, there is no evidence to either encourage or discourage the use of acupuncture for the treatment of glaucoma.<sup>3</sup>

A case series with 50 acupuncture treatments for myopia, glaucoma, retinitis pigmentosa, and optic nerve atrophy showed some improvement in visual acuity subjectively, and three out of eight patients with glaucoma had a decrease in pressure in the

eye, although the precise values were not cited.<sup>4</sup> In another case series with over 500 acupuncture treatments for various kinds of ocular diseases, a subset of patients with glaucoma showed remarkable improvement in visual acuity.<sup>5</sup> The authors, however, suggested that acupuncture did not affect intraocular pressure (IOP) obviously and could not regulate IOP alone.

A clinical study of acupuncture on 18 patients with glaucoma and ocular hypertension indicated that IOP is significantly decreased at 15 minutes as well as at 24 hours after acupuncture.<sup>6</sup> Generally, lowering IOP is, so far, the only means of treating glaucoma, and the primary goal of treatment is to prevent glaucomatous damage to the structures and function of the eye.<sup>7</sup> No studies to date have assessed whether acupuncture can keep the IOP lower for more than a brief period of time following a treatment; to determine whether this is possible, a protocol involving a series of consecutive treatments is necessary.

According to the principles of traditional Chinese medicine (TCM),<sup>8</sup> selection of the acupoints and methods of acupuncture are generally based on the TCM diagnosis—rather than on the conventional diagnosis of “glaucoma”—and adjusted according to the patients’ condition and disease status at the moment of treatment. This individualized approach makes it difficult for medical practitioners who are unfamiliar with TCM to understand or apply acupuncture in the clinical setting. If an acupuncture method that does not need an exact TCM diagnosis is found to be effective, acupuncture could be used more easily as a treatment for glaucoma.

The purpose of the present pilot study was to examine how manual acupuncture affects IOP and visual acuity in patients with glaucoma during five weeks of treatment and four weeks of

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follow-up. The present study focuses on three points: (1) the short-term effect of the present acupuncture method (its potential and reproducibility), (2) the long-term effect of the present acupuncture method (its durability and accumulation), and (3) acceptability of the present acupuncture method (alleviated symptoms, feeling, adverse effects or risks, subjects' willingness to continue acupuncture).

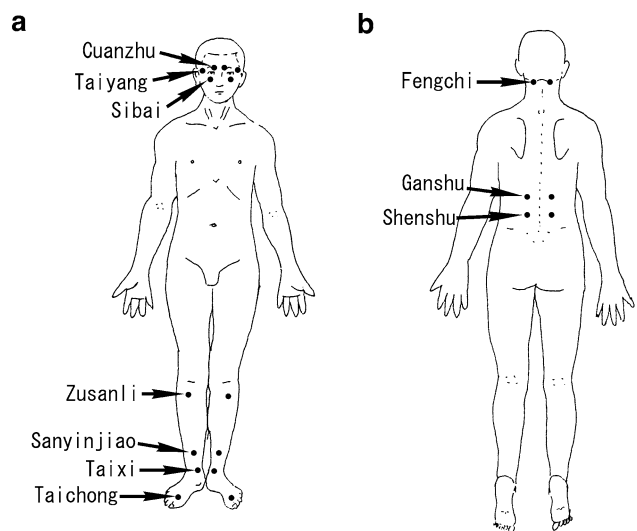
## METHODS

Eleven patients (age,  $66.2 \pm 8.20$  years; mean  $\pm$  SD; five males, six females) were recruited through advertisement at the clinic for glaucoma of the Department of Ophthalmology, Tohoku University School of Medicine. None of them had experienced acupuncture before. The inclusion criteria were as follows: (1) age 20 years or older and (2) unilateral or bilateral glaucoma treated for at least one year with ocular hypotensive medication. The exclusion criteria were as follows: (1) laser trabeculoplasty, any ocular surgery, or inflammation within one year; (2) other abnormal ocular conditions; and (3) starting or adjusting the use of any systemic medication affecting IOP within three months. Subjects were assessed for eligibility at a regular monthly visit, and written informed consent was obtained before enrollment. Ethical approval was given by the ethics committee of the Tohoku University School of Medicine.

Of the 22 eyes in these 11 subjects, 20 showed glaucoma (11 primary open-angle glaucoma (POAG), two exfoliative glaucoma, two normal tension glaucoma, four primary angle-closure glaucoma, one secondary glaucoma because of trauma), one showed phthisis bulbi because of Eales disease, and one was normal. All the glaucomatous eyes were treated with topical medication consisting either of prostaglandin analogs,  $\beta$ -blockers, carbonic-anhydrase inhibitors, parasympathomimetics,  $\alpha$ -1-blockers alone, or a combination of the above. Two eyes of one subject with POAG were treated with systemic carbonic-anhydrase inhibitors, and 12 eyes had a past history of laser iridotomy or surgery. According to the Anderson criteria,<sup>9</sup> five eyes were classified as mild, two as moderate and 13 as severe.

The protocol of our study was as follows. Acupuncture was carried out twice a week during four weeks and once in the fifth week, totaling nine times. Objective and subjective examinations were performed at approximately 15 minutes before and 15 minutes after acupuncture once a week during the five-week sessions. The subjects were followed for four weeks following the completion of the therapy. Because there is a diurnal fluctuation in IOP, we consistently performed the treatments and the assessment procedures between one and four PM.

One licensed acupuncturist and one physician-acupuncturist with over two years of acupuncture experience administered the acupuncture in the study. Acupuncture was performed by inserting disposable stainless steel needles (0.16 mm or 0.20 mm  $\times$  40 mm; Seirin Co. Ltd., Shizuoka, Japan) to a depth of approximately 20 mm at all acupoints or tender points, except points such as Cuanzhu (BL2), Sibai (ST2), Taiyang (EX-HN4), or Taichong (LR3) at which the subcutaneous tissue is very thin, and the needles were inserted close to the skull or bones, to a depth of approximately 3 to 10mm. Needles were simply inserted without any intention of eliciting specific responses such



**Figure 1.** (A) Acupoints used in the supine position. (B) Acupoints used in the prone position.

as *de qi* feelings, and neither needle manipulation techniques nor other auxiliary interventions were used.

Based on our clinical experience of TCM, we predicted that most patients with glaucoma would suffer from “Liver” or “Kidney” patterns, so we selected the 20 acupoints that had been most frequently used in our practice (Figure 1). Taichong (LR3), Taixi (KI3), Sanyinjiao (SP6), Ganshu (BL18), Shenshu (BL23), and Fengchi (GB20) were chosen to treat a possible imbalance and pathology of “Liver” and “Kidney” meridians, and Zusanli (ST36) was chosen to tonify Qi (energy) for the eyes. Cuanzhu (BL2), Sibai (ST2), and Taiyang (EX-HN4) were the main local points around the eyes; all of these points are commonly used in ocular diseases. If the subjects suffered from any pain, and the acupuncturists found prominent tender points besides the predetermined 20 acupoints, we needled these tender points in the head, shoulder, back, or knees. The number of additional acupoints treated was  $3.0 \pm 2.2$  per treatment.

For the acupuncture treatment, the subjects rested in a supine position at first for 15 minutes for the insertion of the needles in the 14 acupoints shown in Figure 1A. Following this, subjects moved to a prone position for 15 minutes for the 6 acupoints shown in Figure 1B.

As an objective examination, IOP and visual acuity with or without glasses were measured by an ophthalmologist. IOP was measured with a Goldmann applanation tonometer. Visual acuity was examined with a 5-m visual acuity chart, and visual field was tested using a Humphrey Field Analyzer (Carl Zeiss Meditec AG, Jena, Germany). Subjective examination was carried out by a questionnaire, which consisted of 0-to-10 visual analog scales (VAS) of ocular pain, and other questions to be answered on a scale of zero to three (zero, none; one, slight; two, moderate; three, severe) in regard to blurred vision, asthenopia, dry eye, shoulder stiffness, irritated feeling, and general fatigue.

To assess the IOP and visual acuity changes as a result of the acupuncture treatment, we expressed the data as a percentage

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