

Electro-Acupuncture for Visual Rehabilitation after Ischaemic Stroke: A Case Report

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Abstract

Objective: To observe the effects of electro-acupuncture on visual function in patients with recent visual loss from a cerebral vascular accident.

Patient: An 84 year-old male incurred a cerebral vascular accident that resulted in moderate to severe visual impairment.

Intervention: Electro-acupuncture tailored according to a traditional Chinese medicine diagnosis (three treatment sessions per week for nine months - 108 treatments).

Main outcome measures: Visual field-testing before and after the series of treatments. The acupuncturist also performed crude visual field testing before and after each treatment session (Donder's Test).

Results: Visual field and visual acuity improved over 80 per cent over a period of nine months.

Conclusions: This case suggests electro-acupuncture may help patients with post-stroke visual symptoms. These results must be interpreted cautiously because of the small sample size. More case reviews and a randomised controlled pilot study are feasible and warranted.

Introduction

Cerebrovascular accident (CVA - the medical term for a stroke) is a leading cause of disability worldwide.¹ When a CVA occurs there is a loss of oxygen in the brain, causing damage which can result in visual impairment such as changes in eye motor function or quality of vision.¹ About 30 per cent of CVA survivors experience some form of visual problem. The type of problem depends on where the CVA occurs in the brain, and symptoms can vary widely. The occipital lobe of the brain is the visual cortex and responsible for most visual functioning.¹ Up to 70 per cent of those whose stroke occurs in the occipital lobe develop visual problems.² Homonymous hemianopia is the most common type of stroke-related vision problem.³ People with this condition can see only half of their normal visual field - either to the right or left out of both eyes (i.e. they see only one side of an object, as if it were cut in half). Other visual problems that a CVA survivor might experience are scotoma (a dark or blind spot within the visual field) or diplopia (double vision). Some individuals may have trouble activating the muscles that control their eyes appropriately, which makes it difficult to track objects and can affect many tasks such as reading and driving. Conjugate

eye deviations can also result from a CVA. This eye muscle disorder causes the person to look toward one side, usually the side of the brain in which the stroke occurred.⁴ A stroke can also result in problems with processing visual input, such as agnosia (inability to process sensory information), agraphia (loss of the ability to write) or alexia (loss of the ability to read).¹ Multiple strokes or lesions may cause multiple patterns of visual field loss.² The impact of visual impairment can be minor or severe and may affect general mobility, capacity for independent living, ability to read and drive, and frequently results in loss of confidence and depression.⁵

High blood pressure, high cholesterol, and smoking are major risk factors for CVA. About half of Americans (49 per cent) have at least one of these three risk factors.⁶ There is some evidence that occurrence of CVA may be decreasing with improved management of lifestyle and blood pressure.⁷ However, because this condition mostly strikes the elderly and we currently have an ageing population, we will be facing this devastating problem and its consequences for many years to come. Risk factors for CVA that are potentially modifiable include atherosclerosis, hypertension, atrial fibrillation, diabetes, congestive heart failure,

coronary heart diseases, alcoholism, recreational drug use, smoking, carotid bruit, transient ischaemic attacks, hyperlipidemia and previous stroke. Other factors that are not modifiable include increasing age, gender and race.⁸ Other sequelae of CVA include paresis, aphasia, apraxia, sensory impairment, dysphagia, incontinence, ataxia, dizziness, psychological disturbance, coma or death.⁹

Traditional Chinese Medicine

Acupuncture is widely used in China to improve motor, sensory, speech and other neurological deficits in stroke patients, and is well accepted by Chinese patients.¹⁰ As a therapeutic intervention, acupuncture is increasingly practised in Western countries.¹¹ Studies in animals and humans have demonstrated that acupuncture causes multiple biological responses, including neurological, circulatory and biochemical effects.¹¹

In Chinese medicine stroke is called *zhong feng* or 'wind stroke'.¹² It is characterised by sudden loss of consciousness, facial paralysis, slurred speech and hemiplegia. It is thought to have a variety of pathomechanisms including:

- Inadequate rest, emotional stress and excessive sex cause Kidney yin deficiency, resulting in Liver yin being inadequately nourished. This causes Liver yang to rise and generate Liver wind. Symptoms attributed to Liver wind include apoplexy, coma, dizziness and paralysis. The depletion of the channel system from overwork and insufficient rest also leaves the individual susceptible to the effects of external wind.¹²
- Eating excessive rich, fried, greasy and sweet food damages the Spleen qi and can lead to accumulation of phlegm. The nature of phlegm is obstructive and causes symptoms of numbness, aphasia and mental confusion. By obstructing the circulation of qi, phlegm also gives rise to fire.¹²
- Deficiency of the Kidney or Spleen due to the above lifestyle factors can compromise the body's ability to generate blood. Deficiency of blood can lead to blood stasis, which gives rise to symptoms of stiffness and pain in the limbs.¹²

Wind stroke is categorised into two types: a more severe type known as 'attack on the internal organs' and a less severe type called 'attack on the channels'.¹² An attack on the channels presents with the following symptoms: hemiplegia, numbness of the limbs, deviation of the mouth and slurred speech, headache, dizziness, vertigo, tinnitus, insomnia, dream disturbed sleep, fever and chills, soreness and pain of the joints, muscular stiffness of the limbs. The hallmarks of the more severe type 'attack on the internal organs' include loss of consciousness, coma and aphasia. This severe type can be further categorised

into 'closed' and 'open' types. The 'closed' type is due to a collapse of yin; it is also known as the 'tense' type as the symptoms involve tight and clenched muscles, retention of urine and stool, and the pulse and tongue tend to show evidence of heat, wind and phlegm. The 'open' type, also known as the 'flaccid' type, manifests with relaxed muscles, incontinence of stool and urine, and the pulse and tongue show deficiency and cold. The 'attack on the organs' may evolve over time from an acute state into a more chronic state; often symptomatically coming to resemble the picture of the attack on the channels.¹²

As with all diseases in traditional Chinese medicine (TCM), treatment should be based on pattern differentiation in order to give the best possibility of recovery for the patient. The TCM practitioner must seek to remove obstruction, invigorate the channels, subdue wind, resolve phlegm, as well as tonify the qi, blood, yin or yang as necessary.¹²

Case description

This case describes an 84-year-old retired car salesman who suffered a cortical stroke which resulted in almost complete homonymous hemianopia affecting his left eye, and left-sided facial droop. Initially the severity of his vision loss was 90 per cent. His vision would fluctuate and was worse during stressful moments, when driving, rushing or feeling agitated and better when reading a book or relaxing (and, as we later found out, after acupuncture treatment).

The patient had recently received gastric surgery. He had originally had gastric bypass surgery in his twenties to alleviate his gastroesophageal reflux disease (GERD), but the oesophagus had begun to detach from the stomach and required surgery to reattach it. Following the recent surgery his blood pressure had been on average 90/180 mmHg. He was put on warfarin following the surgery. He also had a history of atrial fibrillation. These factors may have contributed to the cause of the stroke, which happened two months later.

His family health history included a mother who had diabetes (and died in a car accident) and a father who had heart disease and died of myocardial infarction. At the time of his consultation the patient was taking the following medication: Digoxin (20 milligrams per day) for atrial fibrillation, Lasix (10 milligrams three times per week) for blood pressure regulation, Xarelto (15 milligrams per day) to thin his blood, and a fibre supplement for constipation. His orthodox medical diagnoses were hypertension, atrial fibrillation, history of cerebral vascular accident, oedema of the lower extremities and peripheral neuropathy.

Other diagnostic findings in his Chinese medicine intake were as follows:

Temperature: Warm.

Sweating: Some night sweating and clammy skin during day.

Headache/Dizziness: Frontal headaches three times per week, accompanied by unsteadiness/loss of coordination and slight dizziness.

EENT: blurry vision, especially left eye, floaters in both eyes, dry eyes associated with hay fever.

Chest: A history of angina induced by exertion, none now. No shortness of breath.

Urination: Yellow, without burning or pain; some dribbling before urine stream is initiated.

Stool: Chronic constipation with hard, dry, difficult to pass stools and some pain.

Energy: Rated at five out of ten.

Sleep: Falls asleep quickly, wakes to urinate up to three times per night, falls back to sleep easily.

Appetite/Digestion/Thirst: Appetite is 'ok', could be better. No major digestion issues, no pain, no bloating, some gas. No particular thirst.

Diet: Coffee and a cookie in the morning, a sandwich or soup for lunch, and meat, potato and vegetable for dinner. Two glasses of water intake per day. The patient has been encouraged to add more fruits and vegetables to diet and to drink more water.

Exercise: A dog walk once per day.

Initially the severity of his vision loss was 90 per cent.

His pulse was wiry, irregular and stronger on the left. His tongue was puffy, moist, scalloped, red, with lots of small cracks and a tongue coat which was scanty and without root at the back.

After the stroke he had appointments with his cardiologist and neurologist every three months. He did physical therapy for the first three months and started acupuncture treatment within one week of the stroke at a frequency of three times per week for nine months.

Diagnosis

The diagnosis was Liver and Kidney yin deficiency (cracked tongue, scanty tongue coat, night sweats, floaters, blurry vision and loss of eyesight, constipation, cracked tongue and rapid pulse) with wind-phlegm obstructing the Gall Bladder channel (dizziness, headache at Yangbai GB-14 and loss of coordination).

Treatment

The treatment was acupuncture and Chinese herbal medicine based on the principles of nourishing Liver and Kidney yin, extinguishing wind, unblocking the channels and collaterals and opening the orifices. Sessions were three times per week, as this was how frequently the patient could commit to commuting for treatments. In China, the standard protocol for electro-acupuncture treatment post-CVA is to treat daily or even twice daily

until no further improvement occurs. A typical electro-acupuncture session lasted an hour and a quarter with the patient in a supine position. Treatment was preceded by a 20-minute interview with crude visual testing (Donder's test). To do this test the patient covers one eye with a hand and looks straight ahead (visually fixed on a single point) while the tester moves her hand into their visual field. The patient is asked to signal when the hand comes into view. This test was also performed after each acupuncture treatment.

Acupuncture points were selected based on Zhu's scalp system, four needles transversely inserted over the visual cortex on the occiput (see Figure 1 - two needles were used along each line of the vision area). Balance brand 50 millimetre and 34 gauge needles were used. Strong manipulation was applied to the needles: lifting, thrusting and twisting for five minutes. Then the needles were hooked up to electrodes and electricity was applied through a Pantheon Electro Stimulator set at a mixed frequency of 100/2 millihertz and an intensity of two to three out of six (according to the patient's tolerance).

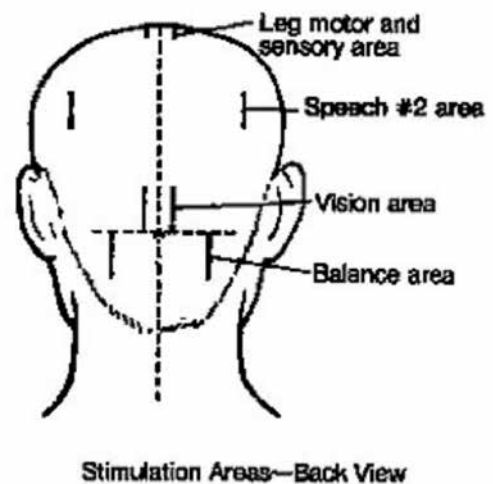


Figure 1: Scalp acupuncture locations¹⁴

Various other points were selected and used throughout the many treatments, including:

- To promote vision and benefit the eyes: Yanglao SI-6, Jingming BL-1, Chenqi ST-1, Tongziliao GB-1 and Taiyang M-HN-9.
- To extinguish wind and benefit the eyes: Fengchi GB-20.
- To nourish Kidney and Liver yin: Fuliou KID-7, Taixi KID-3, Zhaohai KID-6, Taichong LIV-3 and Sanyinjiao SP-6.

Herbal formula: Modified *Qi Ju Di Huang Wan* (Lycium Fruit, Chrysanthemum and Rehmannia Pill - KPC granules)

Shu Di Huang (Radix Rehmanniae Preparata) 24g

Shan Zhu Yu (Fructus Corni) 12g
 Shan Yao (Rhizoma Dioscoreae) 12g
 Fu Ling (Sclerotum Poriae Cocos) 9g
 Mu Dan Pi (Cortex Moutan) 9g
 Ze Xie (Rhizoma Alismatis) 9g
 Gou Qi Zi (Fructus Lycii) 15g
 Ju Hua (Flos Chrysanthemi) 15g
 Da Huang (Radix Rhizoma Rhei) 10g
 Mang Xiao (Natrii Sulfas) 8g
 Yu Li Ren (Semen Pruni) 10g
 Chai Hu (Radix Bupleuri) 6g
 Yu Jin (Radix Curcumae) 9g
 Dose: Five grams three times per day.

The patient was very compliant and consistently took his herbal formula. He was also recommended to drink eight cups of water per day (with cucumber slices and lemon to make it taste more pleasant) and to drink three cups of Ju Hua (Flos Chrysanthemi) and Gou Qi Zi (Fructus Lycii) tea per day. This two-herb combination is known for brightening and moistening the eyes, and nourishing yin.

Results

During the first seven months of treatment the patient's visual field tended to expand by 10 to 15 degrees after each session, but would typically decrease again between treatments. On average, every three weeks (nine treatments) the visual field periphery range would permanently expand. After 7.5 months the visual field had expanded by 80 degrees, and remained at this level. Visual acuity also improved over 80 per cent, as confirmed by the patient's optometrist. The last eight weeks of treatment showed his vision was no longer detectably improving, so at month nine it was agreed that the patient would reduce treatment frequency to once per week and transfer to a local acupuncturist as the long-distance travel for treatment was tiring. After several more months (the one-year anniversary of his stroke) he stopped all acupuncture treatment.

Discussion

This 84-year-old patient with left-sided visual loss from a cerebral vascular accident reported a clinically meaningful increase in his visual field and visual acuity after nine months of electro-acupuncture and herbal treatment. In terms of prognosis, without any intervention 40 per cent of patients experience some degree of improvement in central vision or visual acuity weeks to months after a CVA. In some patients, the loss of side vision may not improve, although many learn to adapt to the field loss and become less aware of the loss over time.¹⁸

Many population-based studies have provided data on the prevalence and incidence of stroke and associated disability. However, few have described the prevalence of stroke-related visual disability, which may include

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homonymous visual field loss.¹⁵ Half of the patients within the papers reviewed were not aware that they were suffering from homonymous hemianopia.¹⁷ It was noted that routine screening for visual field defects is not currently universal and therefore potential patients were not identified or referred for therapy.¹⁷ Few studies examine the visual status of a cohort of stroke rehabilitation patients and determine to what extent visual function may be improved by simple interventions (such as corrective refraction). Stroke professionals should therefore enquire about patients' spectacles and assess their condition. Patients with reduced visual acuity in the absence of significant non-refractive disease should be referred to an optometrist for diagnosis. In one case series 14 per cent of patients had visual impairment which benefited from refractive correction.¹⁷ Despite considerable research efforts on multiple treatment modalities, there is still no single rehabilitation intervention that demonstrated unequivocally to aid recovery. This drives patients to search for effective treatment in an attempt to further improve the outcome of their rehabilitation.¹² This case suggests that TCM may be a useful intervention to improve visual acuity and visual field deficits as part of rehabilitation after a CVA. More case reviews and randomised control trials are warranted to confirm this.

Conclusion

This single case review suggests that TCM treatment, including electro-acupuncture and Chinese herbal medicine, may help patients with visual stroke symptoms. This patient experienced significant recovery of visual acuity (80 per cent) and visual field (80 degrees) deficits over a period of nine months. However, this suggestion must be interpreted cautiously because of the small sample size. More case reviews and a randomised controlled pilot study are feasible and warranted.

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Newsbites

A 21st century bronze man

Students at Beijing University of TCM are studying the location and needling of acupuncture points using a virtual reality 3-D model of the human body developed by BodyMap in the USA. This allows them to see the underlying structures through which the needle passes.

New TCM Hospital for Hong Kong

Hong Kong's first Chinese medicine hospital is due to open in 2024 after the Chief Executive of Hong Kong announced a policy of incorporating traditional medicine into the city's health care system. The hospital, described as a 'flagship institution' for treatment and education, will be equipped with 400 beds.

The Hong Kong paradox

The Hong Kong paradox is the fact that its population enjoys the one of the greatest life expectancies in the world (81.7 years for men and 87.7 for women) despite being

the seventh least happy place to live. There are a number of factors that might explain this puzzle. People in Hong Kong walk more than anyone else - an average of nearly 7000 steps a day; medical facilities are easily accessible; family and social bonds are strong; the older population of Hong Kong came mostly from Guangdong province on the mainland and are famed for being tough and resilient, expressed in the saying, 'There's time to die, but no time to waste on being ill'. Finally, there is evidence that moderate levels of stress may stimulate the human organism and be healthier than either excessive or very low levels.

The worm turns

The Lancet medical journal has launched a powerful attack on 'big food' - the food industry's powerful coalition of lobbyists and commercial interests that for decades has corrupted food production, consumption and marketing throughout the world. A report by *The Lancet*, and other similar reports, warn that unless

our societies are brave enough to take on these vested interests, all our futures are threatened. They say that obesity and other diet-based chronic diseases have increased in every country in the world; that precious and irreplaceable habitats have been sacrificed to grow soya and corn to fatten animals for the junk food market; that soil fertility is so compromised that it is estimated many areas only have 60 viable harvests left; that pesticides are destroying insect life, including essential pollinators, and have contaminated virtually every land and and marine environment; and that modern agriculture is responsible for a massive third of all carbon emissions. But the good news is that there are viable alternatives if we push to make them happen. Organic agriculture can rebuild soil health, enhance biodiversity and capture vast amounts of carbon as humus builds up in the soil. And the evidence is that if less food is wasted, and if we significantly reduce meat production (a climate change necessity) the world can be fed perfectly adequately on small scale organic agriculture.