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CLINICAL VIGNETTE

Oculomotor Nerve Palsy – An Integrative East-West Approach

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Introduction

The use of traditional Chinese medicine has been reported for the treatment of various eye disorders including Graves' orbitopathy, cranial nerve palsies, dry eyes, and retinitis pigmentosa.¹⁻⁴ Here we describe a case report using an integrative East-West approach to treat a patient with oculomotor nerve palsy.

Case Report

A 64-year-old Filipino male with a past medical history of hypertension and hyperlipidemia presented to our clinic with persistent diplopia (horizontal/oblique) for 3 weeks after returning from a trip to the Philippines. His left eye had complete ophthalmoplegia with a "down and out" appearance. He described having profound sensitivity to light in his left eye. There was no spontaneous improvement over the 3 week period. He denied any pain, ataxia, paresthesias, extremity weakness, headache or tremor. He was seen and evaluated by Ophthalmology and Neurology. MRI/MRA of the brain was negative. Laboratory tests demonstrated an LDL 169, total cholesterol 199, and an erythrocyte sedimentation rate 43. Fasting blood sugar, hemoglobin A1c, and thyroid function tests were all within normal limits. Medications and supplements included lisinopril, atorvastatin, baby aspirin, fish oil, and coenzyme Q10.

Vital signs: Afebrile, Blood pressure 140/82, Heart rate 76, Respiratory rate 14. On physical exam, his left eye had paresis during ocular upgaze, downgaze, and adduction with marked ptosis of the upper eyelid. He was found to have anisocoria with a dilated left pupil that had very sluggish reactivity to direct and consensual light and accommodation. Neck muscles were also tight with several trigger and tender points identified, especially along the left side.

Acupuncture points included: LI 4, Liv 2 & 3, SJ 3, LI 11, GB 20, St 36, GB 34, Sp 6; Left UB 2, GB 14, Taiyang, St 3 and Ear shenmen.

Trigger point injections with 1% lidocaine were performed along the left side of his neck, including the left trapezius, splenius cervicis, and splenius capitis muscles.

He received a total of 3 treatment sessions consisting of acupuncture and trigger point injections with complete resolution one week after his 3rd treatment.

Discussion

Oculomotor (third cranial) nerve palsy occurs when there is injury involving the nerve path emanating from the oculomotor nucleus located in the midbrain to its distal branches that innervate various extrinsic muscles of the eye, including the levator palpebrae superioris, superior rectus, medial rectus, inferior rectus, and the inferior oblique. Additionally, the oculomotor nerve supplies the parasympathetic nerve fibers to the sphincter pupillae of the iris and ciliary muscles, via the Edinger-Westphal nucleus and its branch to the ciliary ganglion and the short ciliary nerves. Therefore, the oculomotor nerve is responsible for eye movement upward, downward and medially; lifting of the upper eyelid; convergence of the eyes; constriction of the pupil; and accommodation of the eye.

Patients with dysfunction of the oculomotor nerve typically present with diplopia and a "down and out" appearance of the eye from paresis of several extraocular muscles and ptosis of the upper eyelid. The pupil may be dilated and its response to direct and consensual light sluggish or absent with a glare sensation to bright light experienced in the affected eye.

An important clinical point is to determine if the oculomotor nerve palsy is pupil-sparing versus pupil-involving as the former is commonly caused by ischemic insult from conditions that lead to atherosclerosis such as diabetes mellitus, hypertension or hyperlipidemia, while the latter is concerning for mass effect due to compression of the nerve most commonly from an aneurysm involving the posterior communicating (PCOM) artery.

However, up to 17% of patients with PCOM artery aneurysm can present with pupil-sparing oculomotor nerve palsy.^{5,6} Conversely, in a review of patients diagnosed with ischemic oculomotor nerve palsy over nearly a 50 year time span, the incidence of pupillary involvement was 21.3%.⁷

Other causes of oculomotor nerve palsy include: stroke, neoplasm, abscess, infectious meningitis, internal carotid aneurysm, lymphomatous/leukemic meningeal infiltration,

metastatic cancer, granulomatous disease, pituitary apoplexy, ophthalmoplegic migraine, sellar chordoma, disorders involving the cavernous sinus, infections like mucormycosis and neurobrucellosis, pseudotumor cerebri, odontogenic abscess, nonaneurysmal subarachnoid hemorrhage, sphenoiditis, and polycythemia vera.

Conditions that are a part of the differential diagnosis are giant cell arteritis, intraorbital structural lesions, herpes zoster, thyroid orbitopathy, multiple sclerosis, and disorders of the neuromuscular junction such as myasthenia gravis.⁸

While isolated oculomotor nerve palsy is most common, various neurologic syndromes due to midbrain lesions that disrupt the oculomotor fascicle can also arise with concomitant manifestations such as contralateral hemiparesis (Weber’s syndrome), ataxia (Claude syndrome), and choreiform movements (Benedikt’s syndrome).⁹

Treatment must address the underlying condition. If dysfunction of the oculomotor nerve still persists, then other conventional Western treatments are considered include prism therapy, eye patching, botulinum toxin injections, and strabismus surgery. Acupuncture has also been reported as a therapeutic option for oculomotor nerve palsy as well as electroacupuncture combined with acupoint injection.¹⁰⁻¹²

Our patient presented with oculomotor nerve palsy that was likely due to ischemic insult given his history of hypertension and hyperlipidemia and an MRI/MRA of the brain that was negative for intracranial aneurysm or other compressive lesion. His presentation, however, was atypical since he had concurrent pupillary involvement.

Ischemic oculomotor nerve palsies are generally attributed to extra-axial injury involving the core of the third cranial nerve, which derives its blood supply from the vasa nervorum.⁷ With pupillary involvement, there may be hypoperfusion of pupillary fascicles in the midbrain or the pupillomotor fibers that receive its blood supply from pial vessels.

Acupuncture has been demonstrated as a potential therapy to improve cerebral blood flow in areas of ischemia. A study utilizing single-photon emission computed tomography (SPECT) brain perfusion imaging showed that acupuncture can augment perilesional cerebral blood flow in patients with stroke.¹³ The enhanced circulatory effect of acupuncture may be due to increased local levels of nitric oxide or an elevation of plasma vascular endothelial growth factor (VEGF) associated with circulating endothelial progenitor cells.^{14,15} A consensus conference convened by the National Institute of Health (NIH) also concluded that acupuncture may be useful as an adjunct treatment or part of a comprehensive management program for stroke rehabilitation.¹⁶

While ischemic oculomotor nerve palsies can often resolve within several months, most patients do not prefer a watchful waiting approach to care, especially since symptoms such as diplopia can cause significant disability and adversely impact quality of life and daily functioning. This was certainly true of

our patient, who had debilitating and unremitting symptoms for 3 weeks and was previously highly functional.

Integrative East-West medicine, and in particular acupuncture, may serve as a useful therapy to hasten recovery in patients with oculomotor nerve palsy. Our patient had marked improvement of his symptoms and quality of life after his first treatment with complete resolution over the course of 3 visits. Moreover, he was able to drive again.

This case report was presented at the Ronald Reagan UCLA Medical Center during a Joint Conference between UCLA Jules Stein Eye Institute & the Eye Hospital of the China Academy of Medical Sciences, March 15, 2014.

Figures and Images

	Pre-Treatment	After 1st Treatment	After 2nd Treatment (one week apart)
Diplopia	3 weeks persistent/unchanging	“60% improvement”	“80% improvement”
Ptosis	Severe	Moderate	Mild
Ophthalmoplegia	Complete	Partial (Able to see single image with accommodation/convergence)	None
Light sensitivity	Profound	Mild	None
Pupil reactivity to light, accommodation	Very sluggish	Near-normal	Normal and equal bilaterally
Other	Unable to drive		Wants to drive

Image 1. Pre-Treatment.



Image 2. After 1st Treatment.



Image 3. After 2nd Treatment (one week apart).



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