CASE REPORT

Electroacupuncture Combined with Chinese Herbal Medicine, Qidong Huoluo Granule, for Amyotrophic Lateral Sclerosis: An 8-Month Case Report

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ABSTRACT

Background • Amyotrophic lateral sclerosis (ALS) is an adult neurodegenerative disorder characterized by progressive muscle weakness and eventual paralysis, for which there is currently no curative treatment. Mainstream medical interventions primarily focus on providing supportive care. However, acupuncture offers promising avenues for alleviating symptoms and enhancing quality of life. Specific acupuncture points are targeted to address bulbar paralysis as well as paralysis affecting the upper and lower extremities.

Objective • To investigate the efficacy of electroacupuncture combined with Chinese herbal medicine in delaying disease progression and alleviating symptoms of bulbar paralysis in patients with ALS.

Case Presentation • A 51-year-old male presented with a 4-year and 8-month history of weakness in his left arm and both legs, accompanied by muscle cramps and diminished coordination, which had rapidly worsened over the past year. ALS was diagnosed, and the patient was initiated on oral Riluzole (50 mg) and Qidong Huoluo granule, a Chinese herbal compound, administered twice daily. Concurrently, he underwent acupuncture treatment sessions twice weekly for over 8 months.

Results • Following acupuncture therapy, the patient experienced gradual stabilization of symptoms, notably improvement in swallowing function. The combination of electroacupuncture and Qidong Huoluo granule resulted in sustained clinical enhancements post-treatment, including improvements in speech, coughing, articulation, and breathing.

Conclusion • Electroacupuncture therapy demonstrates the potential to slow disease progression and ameliorate symptoms of bulbar paralysis in ALS patients. However, further robust clinical research is imperative to explain the precise therapeutic role of electroacupuncture in managing this debilitating condition. Continued investigation into the efficacy and safety profile of electroacupuncture holds promise for advancing treatment modalities for ALS. (*Altern Ther Health Med.* [E-pub ahead of print.])

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INTRODUCTION

Amyotrophic Lateral Sclerosis, commonly known as ALS or Lou Gehrig's disease, stands among the World Health Organization's five most challenging diseases, alongside cancer, AIDS, leukemia, and rheumatoid arthritis.[1,2] It manifests as a heterogeneous neurodegenerative disorder characterized by the progressive degeneration of upper and lower motor neurons. This degeneration precipitates both motor and non-motor symptoms, often culminating in respiratory failure and mortality.[1] The annual incidence of ALS ranges from approximately 1 to 2.6 cases per 100 000 individuals, with a prevalence rate of around 6 cases per 100 000 individuals.[2]

Almost 90% of ALS cases are present as sporadic, with only a small fraction being familial. The average age of onset typically falls between 58 and 60 years, with an average survival time post-diagnosis ranging from 3 to 4 years.[3] The hallmark pathological feature of ALS is the progressive degeneration of motor neurons, driven by a complex pathophysiological mechanism.[4] Currently, treatment options for ALS remain severely limited. Riluzole serves as the standard pharmacotherapy for ALS, albeit with modest efficacy, prolonging patient survival by only 2 to 3 months

and frequently causing adverse effects such as nausea and fatigue.[3,4] Regrettably, no definitive therapeutic modalities exist to address the root cause of neuronal damage in ALS.

Acupuncture, as a non-pharmacological intervention, offers notable advantages in addressing neuronal degenerative diseases. Both domestic and international scholars have directed their attention towards the potential of acupuncture in ALS treatment, citing promising research prospects.[5] Particularly since 2016, there has been a significant surge in clinical research exploring acupuncture as a traditional Chinese medicine (TCM) intervention. Most clinical trials conducted thus far have been in the form of case reports, comprising 59% of the total, while cohort studies represent the second-largest proportion at 28%. Notably, clinical randomized controlled trials focusing on acupuncture treatment for ALS have only emerged since 2016, with a mere four publications to date constituting at least 13% of the total research output.[6]

This case report aims to investigate the efficacy of combining electroacupuncture with Chinese herbal medicine, specifically Qidong Huoluo granule, in managing symptoms and potentially delaying disease progression in a patient diagnosed with ALS. By documenting the clinical outcomes and experiences of this patient, the report seeks to contribute to the growing body of evidence exploring alternative therapies for ALS management. Our findings shed light on novel treatment approaches that may enhance quality of life and offer hope to individuals affected by this debilitating neurodegenerative condition.

CASE PRESENTATION

Patient Profile

The patient is a 51-year-old male resident of the Haidian district in Beijing, China. He received a diagnosis of amyotrophic lateral sclerosis (ALS) at a tertiary hospital in Shanghai in July 2021.

Onset and Initial Symptoms

Symptoms first appeared in May 2019, characterized by weakness in the left lower limb accompanied by muscle twitching. Notably, there were no identifiable precipitating factors. Despite these manifestations, the patient did not report muscle pain, fluctuating symptoms, fatigue, or paraesthesia. Importantly, his ability to perform daily activities, including squatting, standing up, and walking, remained unaffected, with no discernible gait abnormalities. Consequently, he did not seek specialized medical attention at this stage.

Medical Interventions and Progression

In July 2020, the patient underwent partial resection of his right kidney due to clear cell carcinoma, with subsequent postoperative complications. Following surgery, he experienced worsening weakness, particularly in the lower limbs and shoulders, which persisted despite medical intervention. Notably, his left lower limb weakness deteriorated, while weakness in the right lower limb emerged. Concurrently, weakness developed in his left hand, evidenced by difficulty gripping objects such as a towel. Despite initial treatment attempts with baclofen and mecobalamin, symptoms persisted, prompting further medical evaluation.

Surgical Intervention and Subsequent Symptom Progression

In July 2020, the patient underwent a partial resection of his right kidney at the Urology Department of Beijing 301 Hospital due to the presence of an occupying lesion. Subsequent histopathological analysis revealed "clear cell carcinoma of the right kidney," although the specific stage remained undisclosed.

Following the surgery, the patient experienced generalized weakness, particularly pronounced in the lower limbs and shoulders, during periods of rest. Despite the lack of limitations in daily activities, the weakness in his left lower limb progressively worsened from September 2020 onwards. Additionally, he began to notice weakness in his left hand, evidenced by difficulty gripping objects such as a towel. However, he retained the ability to independently perform tasks such as brushing his teeth, washing his face, and combing his hair.

Medical Evaluation and Diagnostic Findings

In September 2020, the patient underwent a medical evaluation at Xuanwu Hospital of Capital Medical University. The physical examination revealed a grade 5- muscle strength in both lower limbs, along with active tendon reflexes. Additionally, a bilateral positive Pap sign (+) was obtained. Magnetic resonance imaging (MRI) of the cervical spine demonstrated posterior protrusion of the C3-6 intervertebral disc, while thoracic spine MRI revealed no abnormalities. Despite symptomatic treatment with baclofen and mecobalamin, the patient's symptoms showed no improvement.

Neurological Treatment and Hospitalization

In December 2020, the patient sought treatment at the Department of Neurology Outpatient Clinic at Peking Union Medical College Hospital. Electromyography revealed extensive neurogenic damage without abnormal repetitive nerve stimulation. Consequently, he was admitted to the Department of Neurology for further management. Upon admission, the patient received gamma globulin shock therapy, as well as a regimen including 50 mg of Riluzole twice daily and 60 mg of prednisone per day, among other medications. Following treatment, the patient's condition showed improvement, leading to his discharge from the hospital. However, upon subsequent follow-up, despite continued medication, his symptoms worsened due to persistent weakness.

Medical Management and Follow-Up

In May 2021, the patient's prednisone dosage was tapered to 5mg once daily, and he commenced vitamin B maintenance therapy. Despite this regimen adjustment, he

retained mobility with the assistance of crutches. Seeking further evaluation and care, he was admitted to the Department of Neurology at Ruijin Hospital, affiliated with Shanghai Jiao Tong University School of Medicine, for management of ALS in July 2021.

Patient's Clinical Profile

Since the onset of ALS, the patient has maintained consciousness and alertness, with normal dietary intake, sleep patterns, and bowel habits. Notably, between July and October 2020, he experienced a significant weight loss of 15 kg following the diagnosis of kidney cancer; however, his weight remained stable after that. He reported no dermatological manifestations such as rash, joint pain, skin hypersensitivity, or oral and external genital ulcers, nor did he experience dry eyes, mouth, or Raynaud phenomenon.

Medical History and Comorbidities

The patient has a medical history of hypertension spanning nearly 5 years, managed with a daily dose of amlodipine besylate 5mg. This regimen effectively maintained his blood pressure within the range of 120-130/85-90mmHg. Additionally, he was diagnosed with diabetes nearly 5 years ago; however, he discontinued hypoglycemic medications in July 2020 after achieving controlled fasting blood glucose levels ranging from 5.8 to 6.0 mmol/L. Moreover, he has a past medical history of tuberculosis, which was successfully treated over 30 years ago. Notably, the patient's spouse, mother, and son are reportedly in good health.

ACUPUNCTURE TREATMENT PROTOCOL AND THERAPEUTIC TECHNIQUES

The patient was admitted to the Out-patient Department of Traditional Chinese Medicine at Capital Medical University on May 11, 2023, under the care of Associate Professor Cui Hai, a Deputy Chief Physician with Chinese medicine practitioner licenses and over thirty years of clinical experience. The treatment utilized Andi brand disposable, sterile steel needles (size 0.40×40 mm, manufactured by Suzhou Medical Appliance in Jiangsu, China), along with pragmatic placebo needles (size 0.30 × 25 mm).

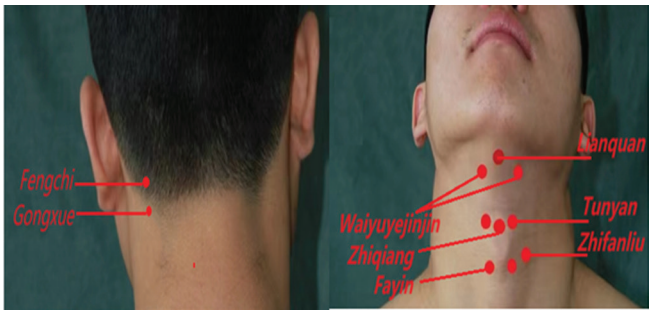
Acupuncture Point Selection and Needling Techniques

Acupuncture points targeted included Fengchi and Gongxue points on the neck, as well as Lianquan, Tunyan, Waiyuyejinjin, Zhiqiang, Fayin, and Zhifanliu points on the pars laryngea. A 0.25mm×40mm millimeter needle was employed for rapid insertion, with direct stabbing of neck and lumbar spine points to depths of 15~25mm. Techniques involving tonifying and purging combined with twisting and lifting maneuvers were implemented to optimize therapeutic outcomes.

Electroacupuncture and Electrode Connection

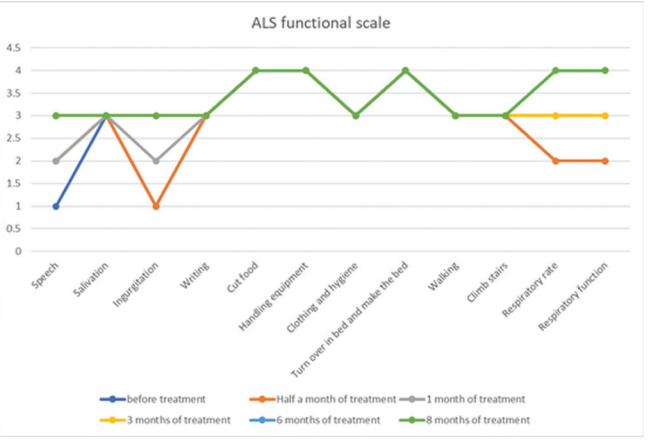
The patient exhibited localized acid swelling as a measure of self-awareness during treatment. Utilizing the KW808-2 electric anesthesia instrument from the Great Wall brand, the same set of electrodes was employed for consecutive sessions. These electrodes were connected to Fengchi and Gongxue acupoints on both sides of the spine, ensuring alignment with the motor nerve conduction bundle's direction, see Figure 1. The electroacupuncture frequency was set at 2Hz, with intensity adjustments based on the patient's self-reported muscle jerking and tolerance levels. Treatment sessions were conducted on Tuesdays and Thursdays weekly.

Figure 1. Acupuncture Point Diagram



Note: The diagram illustrates the location of acupuncture points, including Fengchi and Gongxue points on the neck, Lianquan, Tunyan, Waiyuyejinjin, Zhiqiang, Fayin, and Zhifanliu points on the pars laryngeal.

Figure 2. Improvement of ALS Functional Scale in Patients at Different Time Points



Note: The graph illustrates the improvement in various functions included in the ALS Functional Scale over different intervals of treatment. These functions encompassed speech, salivation, ingurgitation, writing, cutting food, handling equipment and clothing, hygiene, turning over in bed and making the bed, walking, climbing stairs, respiratory rate, and respiratory function. Progression is observed from before treatment to half a month, one month, three months, six months, and eight months into the treatment regimen.

Traditional Chinese Medicine (TCM) Treatment

Additionally, the patient adhered to a daily regimen of Qidong Huoluo granules, a traditional Chinese medicine compound containing Astragalus, Ophiopogon, and other ingredients formulated by our research team. Manual acupuncture, administered by a skilled acupuncturist, involved precise manipulations of twirling, lifting, and thrusting on all needles to elicit the characteristic "Deqi" sensation. The patient reported experiencing sensations, including soreness, numbness, distention, and heaviness during treatment.

RESULTS

Therapeutic Outcomes

Figure 2 illustrates the outcomes following 8 months of acupuncture therapy, revealing notable enhancements in respiratory function, speech articulation, swallowing ability, and other manifestations of bulbar paralysis. Specifically, the patient exhibited significant improvements in articulation clarity, enhanced drinking capabilities, and augmented qi levels as a result of electroacupuncture intervention. Furthermore, the patient experienced alleviated hypermyotonia, enabling gradual independent mobility despite residual limb weakness. Moreover, the patient reported improved sensory perception and expressed satisfaction with the treatment outcomes.

DISCUSSION

The electroacupuncture employed in this case builds upon traditional acupuncture and moxibustion techniques, integrating modern scientific principles and neuroanatomy. Utilizing acupuncture points in the cervical region and incorporating low-frequency pulse currents enhances the efficacy of traditional acupuncture while also providing quantifiable and sustained electrical stimulation. This innovative method not only simplifies and streamlines traditional acupuncture procedures but also offers a cost-effective solution with enhanced therapeutic potential.

In its initial stages, electroacupuncture was primarily applied in the management of pseudobulbar palsy. However, through ongoing and comprehensive research endeavors, its therapeutic scope has significantly broadened. Particularly notable is its efficacy in addressing encephalopathy-related conditions, as well as the myriad symptoms stemming from muscular atrophy, including swallowing difficulties, impaired speech, articulation challenges, and dysphagia.[7]

Electroacupuncture serves as a principal therapeutic modality for managing ALS, primarily through two key mechanisms. Firstly, the electric needle exerts a stimulatory effect on the skin layer of the brain. Research indicates that the pulse current emitted during treatment is consistently transmitted to the posterior horn of the spinal cord via the needle body.[7,8] The spinal reticular tract serves as a conduit to transmit signals to the brainstem reticular formation. This brainstem structure is characterized by a dense nucleus and an extensive network of nerve fibers connecting the spinal cord and the cerebrum. It plays a crucial role in augmenting brain excitability and regulating the upstream reticular inhibition system.[8]

Conversely, the cerebral neurons, when in an inhibited state, can undergo reactivation, thereby enhancing the excitability of the cerebral cortex. This process facilitates the effective interconnection of nerve fibers within the brain, leading to a long-term potentiation effect through repetitive electrical stimulation of the ascending reticular activation system in the brainstem. Consequently, this mechanism aids in rebuilding damaged reflexes and restoring function. Hence, electroacupuncture exhibits a revitalizing effect on cognition, bolstering brain function and cognitive clarity.[8,9]

The Fengchi point is situated in the nuchal region, beneath the occipital bone, within the depression located between the sternocleidomastoid and trapezius muscles. According to modern medical understanding, this location corresponds to the passage of nerves and blood vessels, with the lower aspect of the Fengchi point encompassing the vertebral artery and vertebral vein. Stimulating the Fengchi point through acupuncture is believed to facilitate the development of collateral circulation around areas of hemorrhage and enhance cerebral blood flow. This stimulation also contributes to the improvement of microcirculation, thereby aiding in the restoration of pharyngeal function.[9]

Through the stimulation of the glossopharyngeal nerve, the sublingual spirit sutra, the three-prong spirit sutra, and the mind-wandering spirit sutra, the resulting stimulation is conveyed to the superior motor spirit sutra. Subsequently, the impulse from the spirit sutra is transmitted to the effector organ, and the cerebral cortex and brainstem bundle can be regulated by the higher centers of the brain.[10] Therefore, this study contributes to the improvement of swallowing function. It provides robust evidence supporting the treatment of bulbar paralysis with a combination of electroacupuncture and a Chinese herbal compound (Qidong Huoluluo Granules), which has been shown to delay the progression of swallowing, articulation, and speech dysfunction in ALS.

Study Limitations

It is important to acknowledge certain limitations in this study. Firstly, the study presents findings from a single case, which limits the generalizability of the results to a broader population. Additionally, the lack of a control group and randomization reduces the ability to establish causality and control for confounding variables. Furthermore, the duration of follow-up may not have been sufficient to assess the long-term efficacy and safety of the treatment fully. Future research with larger sample sizes, randomized controlled trials, and longer follow-up periods are warranted to validate these findings further and elucidate the potential benefits of this treatment approach for individuals with ALS and bulbar paralysis.

CONCLUSION

In conclusion, the findings of this study suggest that acupuncture therapy holds promise as a safe and effective treatment option for individuals with ALS. With its minimal side effects and potential benefits in improving various symptoms associated with ALS, including bulbar paralysis, acupuncture emerges as a proactive approach that warrants consideration and promotion in clinical practice. Further research and clinical trials are needed to validate these findings, explain the underlying mechanisms of action, and optimize the integration of acupuncture into comprehensive treatment plans for ALS patients. Overall, the evidence presented underscores the importance of exploring alternative therapies like acupuncture to enhance the quality of life and therapeutic outcomes for individuals living with ALS.

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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AUTHORS' CONTRIBUTIONS

Patient recruitment, Zou X; Statistical data, Shi Y, Zhang T, and Huang A; Conceptualization, Wang TQ; Supervision, Cui H. All the authors read and approved the final manuscript for submission.

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ETHICAL APPROVAL AND CONSENT TO PARTICIPATE

Participation in the study was voluntary, and a signed informed consent form was obtained from each participant before treatment.

REFERENCES

1. Feldman EL, Goutman SA, Petri S, et al. Amyotrophic lateral sclerosis. *Lancet*. 2022;400(10360):1363-1380. doi:10.1016/S0140-6736(22)01272-7
2. Goutman SA, Hardiman O, Al-Chalabi A, et al. Recent advances in the diagnosis and prognosis of amyotrophic lateral sclerosis. *Lancet Neurol*. 2022;21(5):480-493. doi:10.1016/S1474-4422(21)00465-8
3. Meyer T. [Amyotrophic lateral sclerosis (ALS) - diagnosis, course of disease and treatment options]. *Dtsch Med Wochenschr*. 2021;146(24-25):1613-1618. doi:10.1055/a-1562-7882
4. Beswick E, Fawcett T, Hassan Z, et al. A systematic review of digital technology to evaluate motor function and disease progression in motor neuron disease. *J Neurol*. 2022;269(12):6254-6268. doi:10.1007/s00415-022-11312-7
5. Yang X, Wang T. Visual Analysis of Research Hotspots in Amyotrophic Lateral Sclerosis based on Bibliometrics. *Future Integr Med*. 2023;2(3):168-178. doi:10.14218/FIM.2023.00019
6. Wang T, Yang X, Du R, Zheng S, Cui H. Acupuncture in the Treatment of Amyotrophic Lateral Sclerosis: A Research Progress in Clinical Trials. *Altern Ther Health Med*. 2023;29(7):114-118. PMID:37632964
7. Sun Z, Hu Q, Zheng G, et al. Progress of clinical application of electroacupuncture. *Yunnan Zhongyi Xueyuan Xuebao*. 2021;44(02):98-102. doi:10.19288/j.cnki.issn.1000-2723.2021.02.016
8. Gao W. *Ten Wonders of Acupuncture*. China Medical Science and Technology Press; 2019:48-50, doi:10.1007/s11726-017-1001-3.
9. Min L, Sun J, Lu J, et al. Therapeutic effect of Xiangwuji on dysphagia after stroke. *Chinese Journal of Acupuncture and Moxibustion*. 2009;29(11):873-875.
10. Shi X. Acupuncture Therapy. Shanghai: Shanghai Science and Technology Press, 1998.(Books)