

Acupuncture for Multiple System Atrophy: A Case Report

Abstract

Multiple system atrophy (MSA) is a rare and fatal progressive disorder, characterised by autonomic dysfunction and motor impairment. MSA patients exhibit neurodegenerative changes in the brain, involving the accumulation of the protein alpha-synuclein in glial cells. This case study describes a 65-year-old female diagnosed with MSA, who was treated with 192 sessions of acupuncture over a 15-month period. After a year of acupuncture treatment, the patient's condition, measured on the Unified MSA Rating Scale (UMSARS), Scale for the Assessment and Rating of Ataxia (SARA), Berg Balance Scale (BBS), and Hamilton Depression Scale (HAM-D), was found to have improved significantly. Furthermore, no side effects of treatment were reported. The results of this single clinical case study are encouraging and provide evidence supporting the positive effects of acupuncture treatment in reducing the symptoms of MSA.

By: Yun Jin Kim

Keywords:

Acupuncture,
multiple
system atrophy,
neurodegenerative
disorder, Chinese
medicine

Introduction

Multiple system atrophy (MSA) is a rare neurodegenerative disease affecting around 1 in 20,000 people. The majority of cases of MSA are sporadic, usually presenting between the age of 35 and 65 years, and its cause is unknown (Whittaker et al, 2017). MSA is characterised by autonomic dysfunction, combined with various types of motor impairment (Matsushima et al, 2017). It shares many symptoms with Parkinson's disease (PD), including tremors, slow movement, muscular rigidity and poor balance. MSA is characterised by neuropathological findings of neuronal degeneration at multiple sites in the brain (including the cerebellum, pons, inferior olivary bodies of the medulla, striatum and substantia nigra), which accompany the clinical syndrome of atypical parkinsonism, cerebellar ataxia, pyramidal signs and autonomic failure (Papp et al, 1989). The term 'multiple system atrophy' (MSA) was coined to combine an overlapping set of disorders, including olivopontocerebellar atrophy (OPCA), striatonigral degeneration (SND) and Shy-Drager syndrome (Graham & Oppenheimer, 1969).

One distinguishing feature of MSA is the pathological accumulation of the protein alpha-synuclein in oligodendroglial cells, which make the myelin coating that allows neurones to conduct electrical signals rapidly (Wakabayashi, 1998). Inflammatory mechanisms are also involved (Kaufman et al, 2013), however the complete pathogenesis of the

disease remains to be elucidated. Alpha-synuclein is also found to accumulate in PD, in the neurones themselves, where it is a major constituent of the Lewy bodies that are pathognomonic for the disease. The pathogenic mechanisms of the two diseases, along with that of dementia with Lewy bodies (DLB), are thought to be similar, and the three are referred to as synucleinopathies (Spillantini & Goedert, 2000).

MSA is a rapidly progressing disorder, leading to severe motor disability within a few years. While some symptomatic treatments are available, no therapeutic intervention has yet shown convincing effects on disease progression in any synucleinopathy (Fernagut et al, 2014). Since specific biomarkers for MSA have not yet been developed, various symptom assessment scales are used by clinicians in clinical trials on MSA in order to evaluate the effectiveness of treatments.

Acupuncture, one of the oldest and most commonly used forms of complementary and alternative medicine, has existed for more than 2500 years. The traditional theory of acupuncture is based on the premise that there are patterns of energy flow (qi) through the body that are essential for health. Needles are inserted into precisely defined, specific points on the body, each of which has distinct therapeutic actions (Hurtak, 2002). When an acupoint is stimulated, treatment effects tend to occur on parts of the body that lie along the particular channel that contains this specific acupoint (Tong et al, 2010).

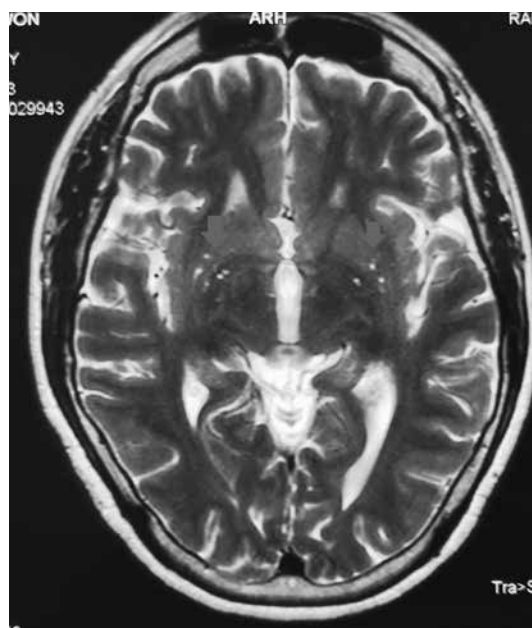


Figure 1: Scattered lesions showing myelin loss in the bilateral frontal lobes.

Here we report the case of an MSA patient, who underwent 192 sessions of acupuncture treatment over a period of one year. During the treatment course, the patient's symptoms were observed to decrease, evidenced by reductions in scores on the Unified MSA Rating Scale (UMSARS), Scale for the Assessment and Rating of Ataxia (SARA), Berg Balance Scale (BBS), and Hamilton Depression Scale (HAM-D). No treatment-related adverse effects were observed. Such findings are encouraging and support the effectiveness of acupuncture in the treatment of MSA.

Case report

The patient was a 65-year-old female who had been diagnosed with MSA two years previously. MRI scanning of her brain at that time showed a few small (less than five millimetres in size) scattered lesions corresponding to myelin loss (punctate hyperintense foci observed utilising T2-weighted or FLAIR MRI sequences), located in the bilateral frontal lobes, plus mild ischaemic changes to

the bilateral frontal and periventricular white matter (see Figure 1).

Acupuncture treatment was provided three times per week, over a period of 15 months. The acupoints used for treatment in this case study were selected based on previous scientific reports of the use of acupuncture for the treatment of patients with MSA and its related complications (Wang & Yang, 2014; Guo & Yang, 2016; Pan, 2014; Sakakibara et al, 2007). Ten acupuncture points were used: Sishencong M-HN-1, Tinggong SI-19, Neiguan P-6, Fenglong ST-40, Yinlingquan SP-9, Yanglingquan GB-34, Xuanzhong GB-39, Zusanli ST-36, Kunlun BL-60 and Taichong LIV-3. Sterile disposable stainless steel acupuncture needles (0.3 x 45 millimetres, Jia Jian Medical San. Bhd. Reg. No.: 20060095) were inserted into the muscle layer. After the deqi sensation was reported by the patient, all acupoints received electrical stimulation for 30 minutes (Hwato SDZ-II Acupuncture Stimulator, Serial No.: 2270611, Suzhou Medical Appliance Factory, Suzhou, China). The intensity of the electrical stimulation was maintained within the patient's tolerance by using the dense-disperse wave function at 5-100 Hz.

Before commencing acupuncture treatment, the patient's scores on the Unified MSA Rating Scale (UMSARS) (Wenning et al, 2004), Scale for the Assessment and Rating of Ataxia (SARA) (Schmitz-Hübsch et al, 2006), Berg Balance Scale (BBS) (Berg et al, 1989), and Hamilton Depression Scale (HAM-D) (Zimmerman et al, 2014), were measured, and these values were used to establish a baseline. During the course of the acupuncture treatment, the patient's scores on these scales were monitored monthly. All data collected during the 15 month treatment period were assessed to determine the effect of acupuncture treatment.

The UMSARS is a comprehensive scale for MSA assessment based on scales such as the Unified Parkinson's Disease Rating Scale (UPDRS) (Matsushima et al, 2016) and the Composite Autonomic Symptom Scale (COMPASS) (Suarez et al, 1999). The UMSARS measures various symptoms of MSA and is very useful for total symptom assessment. The SARA is a brief scale

	Before treatment	3 months	6 months	9 months	12 months	15 months
UMSARS Part 1	23.13±6.23	19.10±2.02	18.27±2.38	17.24±1.15	15.24±1.12	12.75±2.83*
UMSARS Part 2	24.24±5.32	23.28±3.86	21.65±7.29	18.26±6.18	16.57±4.37	13.98±7.46*
UMSARS Part 3 (systolic BP)	130.83±6.26	128.57±9.25	129.83±7.19	125.54±7.41	126.26±3.29	126.48±2.49
UMSARS Part 3 (diastolic BP)	75.98±4.365496	78.29±3.98	76.29±1.57	79.18±2.81	74.59±2.69	76.48±6.35
UMSARS Part 3 (heart rate)	68.54±9.62	67.12±6.49	66.84±9.84	67.15±7.45	68.45±1.94	68.98±1.93
UMSARS Part 4 (global disability scale)	2.90±1.20	2.90±1.60	2.83±1.10	2.74±1.61	2.72±1.10	1.20±1.80

Values represent means ± standard errors of the mean. A lower score indicates a better outcome.

* $p < 0.05$

Table 1: Mean UMSARS scores at baseline and the end of each three month period during the course of acupuncture treatment. After 15 months of treatment, the UMSARS Part 1 and UMSARS Part 2 scores were found to decrease significantly ($p < 0.05$) in comparison with baseline values.

for evaluating ataxia. The BBS is used to assess balance disturbances associated with various conditions, such as stroke and orthopaedic disease. The Hamilton Depression Scale (HAM-D) is used to subdivide patients suffering from depression into severity groups and examine treatment implications (Pilo et al, 1996).

3. Discussion

Despite major advances in understanding the mechanisms of cellular pathology, and the testing of several pharmaceutical drugs in pre-clinical models and clinical trials in recent years (Brice et al, 2017; Ubhi et al, 2012; Monica et al, 2015), no curative treatment for MSA is yet available (Perez-Lloret et al, 2015). Standard clinical management of MSA primarily targets the symptoms of motor impairment, autonomic dysfunction and depression, given that these are

	Before treatment	3 months	6 months	9 months	12 months	15 months
Gait	3.15±2.75	3.13±2.02	3.07±2.38	3.14±1.15	2.94±1.12	2.75±0.83
Stance	3.20±2.46	3.18±1.86	3.16±1.72	3.16±0.18	2.57±0.37	1.93±0.74*
Sitting	3.13±3.62	3.08±1.25	3.03±1.19	2.75±1.41	2.62±0.29	1.87±0.49*
Speech disturbance	3.26±1.22	2.29±0.98	2.29±0.57	2.18±0.81	2.09±0.69	2.06±0.35
Finger chase	2.27±1.11	1.72±1.49	1.68±0.84	1.67±0.58	1.63±0.69	1.61±1.15
Nose-finger test	1.64±1.83	2.90±1.60	2.83±1.10	2.74±1.61	2.72±1.10	2.66±1.80
Fast alternating hand movements (mean of both sides: (R+L)/2))	2.52±1.48	2.51±1.62	2.49±0.91	2.48±1.69	2.48±0.26	2.47±0.61
Heel-shin slide (mean of both sides: (R+L)/2))	2.59±1.36	2.59±1.39	2.58±1.29	2.28±0.34	2.27±0.39	2.28±0.52
Total Score	19.28±1.87	18.63±1.08	18.48±0.92	17.47±0.16	15.34±0.27	13.17±0.75*

Values represent means ± standard errors of the mean. A lower score indicates a better outcome.

*p<0.05

Table 2: Mean SARA scores at baseline and at the end of each three month period during the course of acupuncture treatment. After 15 months of treatment, scores in the categories of stance, sitting and total score had decreased significantly (P<0.05) in comparison with baseline values.

	Before treatment	3 months	6 months	9 months	12 months	15 months
Sitting to standing	2.48±0.83	2.34±0.86	2.21±0.89	1.81±0.03	1.55±0.20	1.32±0.57
Standing unsupported	2.50±0.67	2.38±0.35	2.29±1.10	2.09±1.02	1.23±0.25	1.07±0.22*
Sitting with back unsupported	2.17±0.41	2.01±0.39	2.02±0.02	2.01±0.06	1.91±0.92	1.21±0.49
Standing to sitting	3.14±0.16	3.03±0.19	3.02±0.26	2.53±0.69	2.19±0.94	1.22±0.45*
Transfers	2.42±0.79	2.21±0.13	2.08±0.92	2.01±1.05	2.03±0.51	1.15±0.28
Standing unsupported with eyes closed	3.31±1.12	3.22±1.12	3.16±1.03	3.05±1.23	2.62±0.75	2.49±0.31
Standing unsupported with feet together	3.17±0.18	2.98±1.25	2.48±0.99	1.78±0.02	1.25±0.89	1.08±0.57*
Reaching forward with outstretched arm while standing	2.85±0.51	2.78±0.36	2.53±0.66	2.35±0.69	2.03±0.41	1.83±0.86
Pick up object from the floor from a standing position	2.32±0.45	2.16±0.11	2.08±0.29	2.03±0.30	2.01±0.49	2.00±0.64
Turning to look behind over left and right shoulders while standing	2.32±0.75	2.19±0.97	2.09±1.02	2.01±0.05	2.00±0.95	1.75±0.31
Turn 360 degrees	3.39±0.58	3.20±0.02	3.13±0.06	3.06±0.83	3.01±0.92	2.12±0.57
Place alternate foot on step or stool while standing unsupported	2.45±0.46	2.18±0.64	2.11±0.59	2.08±0.67	1.92±0.13	1.09±0.14
Standing unsupported one foot in front	3.34±0.86	3.30±1.19	3.05±1.16	3.01±0.14	2.31±0.23	2.18±0.75
Standing on one leg	3.32±0.55	3.29±1.64	3.03±1.10	3.03±0.72	3.01±0.10	2.37±0.16
Total Score	33.27±1.58	33.13±0.34	33.07±0.96	32.08±0.24	25.17±0.73	19.15±0.89*

Values represent means ± standard errors of the mean. A lower score indicates a better outcome.

*p<0.05

Table 3: BBS scores at baseline and at baseline and at the end of each three month period during the course of acupuncture treatment. After 15 months of treatment, scores in the categories of standing unsupported, standing to sitting, standing unsupported with feet together and total score had decreased significantly (P<0.05) in comparison with baseline values.

	Before treatment	3 months	6 months	9 months	12 months	15 months
Total Score	19.57±1.98	12.57±2.86	13.66±0.28	11.23±0.87	8.82±0.49*	6.32±0.25*

Values represent means ± standard errors of the mean. A lower score indicates a better outcome.

*p<0.05

Table 4: Mean HAM-D scores at baseline and at the end of each three month period during the course of acupuncture treatment. HAM-D score was highest before beginning acupuncture treatment and was significantly lower (P<0.05) after 12-months of treatment.

associated with poor quality of life for patients (Fetoni et al, 1999). Disease-modification and neuroprotection remain unmet treatment needs.

In traditional Chinese medicine (TCM), two types of MSA have been described. The first is described as the 'deficiency type'. In this type, MSA is the result of deficiency of five of the main TCM organ systems - Kidney, Liver, Heart, Spleen and Lung. Wang & Yang (2010) reported that weakness of the Kidney is the most common (80.26 per cent), followed by Liver (34.21 per cent), while weakness of the other organs occurs less often. This type is always accompanied by a deficiency of qi, blood, yin and yang. The different combinations of these deficiencies give rise to a diverse array of MSA symptoms. The second type of MSA is described as the 'excess type'. Here underlying weakness of the Liver, Spleen, and Kidney organs leads to the formation of phlegm (an excess condition), which plays a part in the the pathogenesis of MSA.

Several other clinical case reports have claimed success in the use of acupuncture for MSA. Ma et al (1998) used acupoints Zusanli ST-36, Sanyinjiao SP-6 and Yanglingquan GB-34 to treat MSA symptoms. Other investigators who combined acupuncture with Chinese herbal medicine also reported good clinical efficacy. Niu & Duan (2005) used acupoints Renyin ST-9, Guanyuan REN-4 and Zusanli ST-36, combined with a Chinese herbal formula composed of Xi Yang Shen (Radix Panacis Quinquefolii), Wu Wei Zi (Fructus Schisandrae), Mai Men Dong (Radix Ophiopogonis), Zhi Fu Zi (Radix Aconiti Lateralis Preparata), Huang Jing (Rhizoma Polygonati) and Zhi Gan Cao (Radix Glycyrrhizae Preparata). They reported that this combination treatment improved symptoms in 94.44 per cent of MSA patients.

Conclusion

The use of acupuncture is on the increase worldwide. It is becoming more accepted by both patients and primary healthcare providers, and has been gaining in popularity outside its Asian countries of origin, particularly in the USA, UK, and Australia. Acupuncture is safe in the hands of competent practitioners (Yamashita et al, 1998) and serious complications are rare (Chan et al, 2017). No adverse effects due to acupuncture were reported by our patient. The results of this case study are promising, and suggest that acupuncture could potentially represent a

safe and effective therapy for treating MSA patients. The mechanisms of action of acupuncture in MSA remain a matter of speculation, but could pertain to its known anti-inflammatory and autonomic regulatory effects.

Kim, Yun Jin Ph.D, currently works in the School of Medicine, Xiamen University Malaysia. His research focuses on clinical evaluation of acupuncture treatment and pharmacological effects of medicinal herbs. E-mail: yjkim@xmu.edu.my

Declaration

The author has no conflicts of interest and no financial interests related to the materials in this manuscript.

Ethical approval

The Institutional Review Board and Medical Research Board, Johor TCM Society, approved this retrospective, observational study. The requirement for the patient's approval or informed consent for the review of her medical records was waived.

References

- Berg, K., Wood-Dauphinée, S., Williams, J.I. et al. (1989). Measuring balance in the elderly: preliminary development of an instrument. *Physiother Can*, 41: 304-311.
- Brice, L., Sylva, V., Miguel, C.L. et al. (2017). Multiple System Atrophy- State of the Art. *Curr Neurol Neurosci Rep*, 17: 41.
- Chan, M.W.C., Wu, X.Y., Wu, J. C. Y., et al (2017). Safety of Acupuncture: Overview of Systematic Reviews. *Sci Rep*, 2017; 7(1): 3369.
- Fernagut, P.O., Dehay, B., Maillard, A. et al. (2014). Multiple system atrophy: a prototypical synucleinopathy for disease-modifying therapeutic strategies. *Neurobiol Dis*, 67: 133-139.
- Fetoni, V., Soliveri, P., Monza, D. et al. (1999). Affective symptoms in multiple system atrophy and Parkinson's disease: response to levodopa therapy. *J Neurol Neurosurg Psychiatry*. 1999; 66(4): 541-544.
- Graham, J.G. & Oppenheimer, D. (1969). Orthostatic hypotension and nicotine sensitivity in a case of multiple system atrophy. *J Neurol Neurosurg Psych*, 32: 28-34.
- Guo, X. & Yang, M. (2016). Case of multiple system atrophy. *Zhongguo Zhen Jiu*, 36(5): 547.
- Hurtak, J.J. (2002). An overview of acupuncture medicine. *J Altern Comp Med*, 8(5): 535-538.
- Kaufman, E., Hall, S., Surova, Y. et al. (2013). Proinflammatory cytokines are elevated in serum of patients with multiple system atrophy. *PLOS ONE*. 8: e62354.

- Ma, L., Song, W.G., Wang, C.G. (1998). Multiple system atrophy in senior people. *Chin Ac Mox*, 18(9): 554.
- Matsushima, M., Yabe, I., Oba, K. et al. (2016). Comparison of Different Symptom Assessment Scales for Multiple System Atrophy. *Cerebellum*, 15(2): 190-200.
- Matsushima, M., Yabe, I., Takahashi, I. et al. (2017). Validity and reliability of a pilot scale for assessment of multiple system atrophy symptoms. *Cereb Atax*, 3(4): 11.
- Monica, F., Lucia V, S., Henry, H. et al. (2015). Multiple system atrophy: the application of genetics in understanding etiology. *Clin Auton Res*, 25(1): 19-36.
- Niu, H. Y. & Duan, H.T. (2005). Treating multiple system atrophy by acupuncture combined with Chinese Medicine. *Chin Ac Mox*, 25(6): 399-400.
- Pan, P. (2014). Case of multiple system atrophy. *Zhongguo Zhen Jiu*, 34(5): 516.
- Papp, M.I., Kahn, J.E., Lantos, P.L. (1989). Glial cytoplasmic inclusions in the CNS of patients with multiple system atrophy (striatonigral degeneration, olivopontocerebellar atrophy and Shy-Drager syndrome). *J Neurol Sci*, 94(1-3): 79-100.
- Perez-Lloret, S., Flabeau, O., Fernagut, P.O. et al. (2015). Current Concepts in the Treatment of Multiple System Atrophy. *Mov Disord Clin Pract*, 2: 6-16.
- Pilo, L., Ring, H., Quinn, N. et al. (1996). Depression in multiple system atrophy and idiopathic Parkinson's disease: a pilot comparative study. *Biol Psych*, 39(9): 803-807.
- Sakakibara, R., Murakami, E., Katagiri, A. et al. (2007). Moxibustion, and alternative therapy, ameliorated disturbed circadian rhythm of plasma arginine vasopressin and urine output in multiple system atrophy. *Intern Med*, 46(13): 1015-1018.
- Schmitz-Hübsch, T., du Montcel, S.T., Baliko, L. et al. (2006). Scale for the assessment and rating of ataxia: development of a new clinical scale. *Neurology*, 66(11): 1717-1720.
- Spillantini M.G. & Goedert, M. (2000). The alpha-synucleinopathies: Parkinson's disease, dementia with Lewy bodies, and multiple system atrophy. *Ann NY Acad Sci*, 920: 16-27.
- Suarez, G. A., Opfer-Gehrking, T. L., Offord, K. P. et al. (1999). The autonomic symptom profile: a new instrument to assess autonomic symptoms. *Neurology*, 52: 523-528.
- Tong, Y., Guo, H., Han, B. (2010). Fifteen-day acupuncture treatment relieves diabetic peripheral neuropathy. *J Acu Mer Stud*, 3: 95-103.
- Ubhi, K., Inglis, C., Mante, M. et al. (2012). Fluoxetine ameliorates behavioral and neuropathological deficits in a transgenic model mouse of alpha-synucleinopathy. *Exp Neurol*, 234(2): 405-416.
- Wakabayashi, K., Yoshimoto, M., Tsuji, S. et al. (1998). Alpha-synuclein immunoreactivity in glial cytoplasmic inclusions in multiple system atrophy. *Neurosci Lett*, 249: 180-182.
- Wang, H.Y. (2010). An overview of treating multiple system atrophy by TCM. *Med Info*, 23(9): 165-166.
- Wang, D.H. & Yang, X.L. (2014). Forty-three cases of hereditary myelopathic ataxia treated with acupuncture-moxibustion combined with Chinese herbs. *Zhongguo Zhen Jiu*, 34(12): 1245-1246.
- Wenning, G.K., Tison, F., Seppi, K. et al. (2004). Development and validation of the Unified Multiple System Atrophy Rating Scale (UMSARS). *Mov Disord*, 19(12): 1391-1402.
- Whittaker, H.T., Qui, Y., Bettencourt, C. et al. (2017). Multiple system atrophy: genetic risks and alpha-synuclein. *FT000Res*, 30 (6): 2072.
- Yamashita, H., Taikayama, H., Tanno, Y. et al. (1998). Adverse events related to acupuncture. *JAMA*, 280: 1563-1564.
- Zimmerman, M., Martinez, J. H., Young, D. et al. (2014). Severity classification on the Hamilton Depression Rating Scale. *J Affect Disord*, 150(2): 384-388.