

# Multiple System Atrophy ( May 31, 2009)

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MSA (Multiple System Atrophy) is a kind of multiple CNS degeneration and atrophy with no clear cause. The following is a case of MSA that we were successful in treating.

Medical history:

Patient is a 65 year old female; she was presented with progressive motor disturbance of her four limbs and has had difficulty with her speech for more than 2 years, her symptoms have been aggravated for more than half a year. She had walking problems in December of 2006, then the disease progressed quickly, she had severe tremors in her four limbs. Patient has been diagnosed with Parkinson's disease and has received anti-PD treatment, but the treatment effects were not good. Her condition continued to deteriorate and she had slurring of her speech, choking problems, difficulty swallowing, difficulty opening her mouth, and slow movement and balance disturbances that gradually became aggravated. It was hard work for her to get out of bed, roll over, walk and turn around. Patient cannot perform fine motor movements and has to write slowly, but she can walk a few steps slowly with an assistant. Patient was diagnosed with MSA in August, 2007. About a half a year before her treatment, her condition had greatly deteriorated: the disturbance in her movements was much worse, she had severe rigidity in all four of her limbs, she could not completely do any voluntary movements, she could not walk, had difficulty opening her mouth, could not eat any solid food by herself. Patient had hypertension for more than 20 years, and suffers from depression. In February of 2005 the patient received a thyroidectomy because of thyroid cancer. She had a bone fracture in her right arm in 2006 and her arm remains deformed. She received a cholecystectomy in 2007. Patient has no medical history of diabetes, CHD, hepatitis, tuberculosis or other infectious diseases. No history of drug allergies.

Admission PE:

Bp 130/70mmHg, Hr 83/min. No remarkable signs of problems with her heart, lungs and abdomen. There is mild pitting edema of her lower limbs.

Neural system examination: alert, mask face, slurred speech, anarthria, her memory, calculation and orientation abilities are all normal. Bilateral pupils are equal and round, diameter is about 2mm. Both eyes have slow reflex to light. The bilateral pupils move slowly, with limitation and mild nystagmus. She had tremors in the muscles of her tongue. Muscle force of upper limbs is 4 degrees, of the left lower limb is 2 degrees, of the right lower limb is 1 degree. Muscle tone increased, and her lower extremities had severe cogwheel rigidity. Tendon reflexes are weaker than normal. Sucking reflex is negative, palmental reflex is positive, Hoffmann sign of both sides is positive, Babinski sign in right side is positive. Sensory system is ok. She cannot participate successfully with the medical examination of her coordinate movements because of her high muscle tone. She suffers from neck rigidity and has to maintain a special posture as a result. Kerning sign is negative, and Brudzinski sign is negative.

Assistant examination:

Brain MRI: Bilateral frontal lobe, pons and cerebellum atrophy.

Diagnosis: MSA

Treatment procedure:

Patient was given treatment to control blood pressure, expand blood vessels, anti-free radicals, nourish neurons, stabilize the cell membrane. This was combined with the neural stem cells activation treatment. After 7 weeks of treatment, the patient's condition greatly improved, her muscle tone decreased quickly, she could lift her head and turn her head to both sides. The movement ability of all her limbs improved noticeably. Muscle force of the upper limbs is 5 degrees, she can do some voluntary movement, and she can lift her arm to her head. Muscle force of the left lower limb recovered to 4 degrees, muscle force of the right lower limb is 3+ degrees. Patient can open her mouth and speak, she still speaks slowly, but her voice is stronger than before. She can chew food by herself, and now she can eat normally.

### **Case analysis:**

MSA is a Synuclein disease. There is a series of symptoms associated with clinical pathological change which includes OPCA (oliva-pons-cerebella atrophy), sporadic degeneration of the nigrostriatal system, accompanied with vegetative nerve functional disturbance: Parkinson's symptoms (tremors, rigidity, walking difficulty); vegetative nerve functional damage (it is related to the loss of lateral horn cells and brain stem pigment group cells. The clinical symptoms are orthostatic hypotension, swoon, impotence, adiapneustia, thirst, urinary retention, fecal incontinence. In general, paralysis of the vocal cords is the most important and earliest symptom of vegetative nerve functional disturbance, (patient always experiences hoarseness); cerebella symptoms and pyramidal signs. The symptoms will be different for every patient, so in 1969, Dr. Graham and Dr. Oppenheimer proposed naming this complicated disease MSA. But currently doctors still cannot find an effective solution.

MSA is a kind of neurodegenerative disorder, through the causal mechanisms research performed on the molecular level; we can see that the amyloid change of the CNS lead by the aggregation and aggradation of hemoprotein is the most important mechanism. That means in the affected neurons, and in the spongiocyte cells, those high soluble proteins can turn into insoluble fibrous polymers, which can transfer into fibrous amyloid deposits which will deposit in the endochylema, cell nucleus and the spatium of extracellulars. These degenerated proteins/ polymers have great neurotoxicity, and they can lead to the damage and death of neurons.

According to recent research, neural stem cells can improve the patient's vegetative nerve, cerebellar extrapyramidal symptoms and movement disturbances effectively. On the one side, these stem cells (neural stem cells and bone marrow mesenchymal stem cells) have a complicated and elaborate self controlling system; they can prevent the protein's malconstruction and

aggregation: molecular chaperone can help the proper protein folding, and prevent the accumulation of non-natural proteins. We can use medication to accelerate the degradation of these malconstructed proteins and endocytose through the ubiquitin-protease bodies system. It can block the development of the disease effectively. On another side, these stem cells can locate in the damaged area of the neural system, repair the damage and help the patient regain more neural functioning.

For these cases, we have a comprehensive treatment for the patient:

1. Improve the internal microenvironment.
2. Stem cells implantation and treatment to help these stem cells locate in the damaged area.
3. Rebuild the neural system; improve the patient's neural functioning.

After the 3 steps of treatment were completed, the patient's condition had obvious improvements. In general, the MSA patient will still have nonreversible neurodegeneration, while the treatment results showed that neural stem cells implantation treatment can be effective for MSA patients. Now we still need further observation and randomized controlled research to verify our findings.