

# Amyotrophic Lateral Sclerosis (May 4, 2009)

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Patient is a 63 year old male, he was presented as having progressive weakness of his 4 limbs, and continual weight loss for more than 2 years, the patient has had swallowing difficulties for about 3 months. He had to come to our hospital for further treatment. About 2 years ago, the patient had weakness in his arms without any inducement and he had difficulties lifting his arms, his hands could not hold any heavy things, the fingers were rigid, stretching the fingers was difficult, accompanied by marasmus and muscular atrophy, the most severe part was his hands. 3 months later, the patient had weakness of his lower limbs, it was difficult for him to walk, and he had great difficulty walking upstairs. Patient's legs got to be noticeably thinner. In the local hospital, after the neural system examination and EMG test, the patient was diagnosed with ALS. He had taken oral medications such as Riluzole and different kinds of Vitamins, while his condition turned out to be more serious, the patient had weakness throughout his body, he could not walk more than 30 meters, and in the past 3 months, the patient had disturbances in his swallowing and he had choked occasionally, he had to prolong his eating time, if the patient was overtired, he had difficulty breathing.

Patient was healthy before with no family history of this type of disease.

Admission PE:

All vital signs are stable; the patient is peaked, alert, with a low and weak voice, with mild slurring of his speech. The eyeballs can move freely. The masticatory muscles are very weak, and the bilateral soft plates are too weak to live life as normal. The Pharyngeal reflex is normal. He had bilateral atrophy of his tongue muscles, with tremors. His sensory system is normal by examination. He has muscular atrophy in his deltoid muscles, bicipital muscles of the arms, thenar muscles and interosseous muscles. The muscle force of his upper limbs is 3 degrees. Patient had mild muscular atrophy of his lower limbs, muscle force is 4 degrees, and the patient also had mild muscular atrophy of his shoulders, back and chest. There is muscle fibrillation of his upper limbs, with fasciculation. Bilateral biceps reflex (+), triceps reflex (+), patellar jerking of both sides are overly active. Bilateral Babinski signs are positive. Other laboratory tests are normal.

EMG: there are abnormal neurogenic muscular electrophysiological changes of the 4 limbs and sternocleidomastoids. The sensory nerves conduction velocity is normal.

The diagnosis for this patient is ALS (amyotrophic lateral sclerosis).

Treatment plan:

Medications to improve the patient's bodily internal environment and control the anti toxic effects of EAA (excitatory amino acid) and strengthen the neuro-protection function.

Autologous stem cells activation treatment and start the self repairing of neural system damage.

4 instances of neural stem cells implantation by lumbar puncture, a comprehensive medication used to help the proliferation and differentiation of those stem cells, together with professional rehabilitation training to accelerate the stem cell's differentiation and recovery of the bodily functions.

Treatment results:

After 5 weeks of systemic treatment, the patient's movement ability has shown obvious improvements: he can speak much more clearly, his swallowing difficulty and choking have been greatly alleviated, and his difficulty with his breathing has disappeared. His muscular atrophy has improved; the muscular volume has greatly increased. Patient has regained about 3kg of weight and his muscles are much stronger than before. After treatment, the patient could lift his arms much easier, and his hands could hold things much more flexibly. He can now walk much longer distances than before.

Case analysis:

ALS is a kind of deadly neural degeneration disease which can damage a patient's upper and lower motor neurons. Ten percent of the cases are hereditary, and ninety percent are sporadic cases. In general, patients suffering from ALS are middle aged, the disease can develop gradually, and there is a progressive weakness of the 4 limbs, muscular atrophy, difficulty swallowing, and breathing, and eventually the patient will die from respiratory failure or circulatory collapse. The average course of the disease is about 3-5 years. Currently, all of the general neurological treatment has proven to be useless except Riluzole (a kind of anti ALS medication).

Riluzole is known as an antagonist of GluR (glutamic acid receptor), yet it has remarkable effects in regards to prolonging a patient's life, while the Riluzole can neither repair the damaged neurons nor help the proliferation of the neural system, so that it cannot alleviate the patient's symptoms of weakness, or improve the patient's overall quality of life. Most patients cannot endure taking it for a very long period, and discontinue using it.

Up until now, the ideal therapy for ALS was to help the regeneration of neurons: it is well-known that neurons cannot regenerate after injury, but stem cells have great potential to differentiate and proliferate, if we can use those neural stem cells to repair the motor neuron injury, that will block the development of the disease, and help the patient regain more mobility, improve their quality of life and ultimately prolong the patient's life.

For those ALS patients, the stem cell treatment is not only simply implanting stem cells, the most important factor is to make those implanted stem cells survive and express normal functions in the patient's body. Even after the stem cells implantation, we still need a series of treatments to control and ensure that the stem cells locate properly to the damaged area, medication to help the restoration of the neural scar tissue, rebuild a new neural connection with self neurons allowing them to grow into normal neurons. Only with this comprehensive treatment can the patient fully achieve improvement of the functioning of the neural system. As a patient, suffering from the typical symptoms of ALS, after the successful treatment, can maintain their improved condition for at least 1-2 years. If the patient has any changes in the future, he can come back for another stem cell treatment to reinforce the previous improvements.

Currently, there is still no complete cure for ALS. But, unlike cancer, which is the unlimited/uncontrolled proliferation of tumor cells, ALS is a kind of motor neuronal damage and loss. To supply some neural stem cells means the slowing down of the development of the disease in a short period, and the patient can regain some of the damage and realize some improvement. We still hope for a new breakthrough in stem cell engineering and stem cell gene engineering, but doctors and researchers still have a long way to go before this is achieved.