

BEIKE BIOTECHNOLOGY

Patient Case Study

Cerebral Palsy

Male, 3 years, February 2019

Summary

Diagnosis	Sex	Age	Nationality
Cerebral Palsy	Male	3 years	USA
Injections	Cell type	Admission date	Discharge date
6	UCBSC + UCMSC	March 2019	April 2019

Condition On Admission

The patient was born premature at 31 week gestation. He was a victim of a cerebral hemorrhage in the lateral ventricles, which caused periventricular leukomalacia and left him diagnosed with cerebral palsy. Before stem cell treatment the patient was affected by spastic and dystonic quadriplegia and developmental delay. His GMFCS (Gross Motor Function Classification System) level was 5. he was mostly fed via gastrostomy/feeding tube and could accept very little amounts of food provided orally everyday. During the initial assessment before starting the treatment, our therapists noticed that the patient had fair head control, he had poor speech (he could only speak some words), his hip flexors, adductors, hamstrings and gastrocnemius muscles were tight, he had mild spasticity in upper and lower extremities, he could grasp small objects but could not do it with enough strength, he had low muscle endurance, his dynamic sitting balance was poor, his static and dynamic standing balance were poor, change of position (supine to side lying, side lying to sitting and sitting to standing) required maximal assistance, he needed maximal assistance for transfers from bed to wheelchair and wheelchair to bed, he could not walk by himself and was affected by “scissor gait”, there was no eye contact and eye tracking, he had short attention span and commands were poorly followed. His overall development was delayed.

Treatment Schedule

Patient received 8 umbilical cord blood-derived stem cell (UCBSC) packets by intravenous (IV) and intrathecal injections, as per the schedule below. In addition to the stem cell administrations, the patient also received a daily rehabilitation program that included physiotherapy, occupational therapy, aquatherapy, transcranial magnetic stimulation therapy, acupuncture and hyperbaric oxygen therapy.

Number	Date	Cell Type	Delivery Method	Side Effects
1	2019-04-01	UCBSC	Intravenous Injection	None
2	2019-04-04	UCBSC	Intravenous Injection	None
3	2019-04-04	UCMSC	Intrathecal Injection	None
4	2019-04-08	UCBSC	Intrathecal Injection	None
5	2019-04-11	UCBSC	Intrathecal Injection	None
6	2019-04-16	UCBSC	Intrathecal Injection	None

Condition at discharge

The therapists noted the following improvements: **Head control:** He can now move his head up and in all directions that physiotherapist commands. He can also move his head to follow interesting things such as a camera or a mirror. As a result, his grade of head control progresses from “fair” to “good”. **Gross motor functions:** The patient has shown some improvements. He has gotten stronger upper and lower limb muscles including trunk muscles. He can do rolling on the bed with minimal assistance and does it easier than during the first assessment. Sitting to standing can now be done with minimal support. **Sitting balance:** His standing balance has improved, thanks to stronger trunk muscles. He can now control his whole body to sit on a bed and roll better. He can strongly move his body to any directions with minimal support. **Standing balance:** He seems to stand more stable for a longer period of time as well. However, he sometimes moves quickly his back backward. **Hand Function:** He uses his right hand more frequently than before. He can use his both arms to grasp something by himself for 3-5 times which he could not do at all before, that has to do with the fact that eye-contact with objects has improved as well. One week after the end of the treatment the patient’s parents noticed an increase in ability to drop from the sofa to a sitting position and remain in the sitting position, using hands and arms to maintain being upright.

Condition 1 month after treatment

The patient's parents noticed small improvements and mentioned: *"Range of movement: His right arm remains tight but he has shown improvement in his left arm. His hips still remain tight but have shown slight improvement. Walking: Able to propel his gait trainer more quickly and with a slightly larger step pattern. Has not mastered turning."*

Condition 3 months after treatment

The patient's parents assessed the improvement level as moderate. They mentioned: *"The walking information was evaluated with Asa in a gait trainer. Walking with manual assistance has improved slightly. Also Asa has shown significant improvement in bilateral hand use, especially playing ball. The area of greatest gains has been in expressive language. [...] Asa is able to participate more in reaching out to catch himself in sitting, especially with his left arm. He is helping to feed himself more. He can use both hands to pick up and throw small ball with another person. His physical therapist assisted in completion of the assessment."*

Condition 6 months after treatment

At the 6 month follow up, the patient's family mentions that improvements are continually being made. *"He is able to maintain sitting on the floor for 5 to 10 minutes at a time and is able to navigate his environment independently by rolling and scooting on his back. He is now able to get himself out of sitting without falling. He is making a greater variety of sounds with his mouth and his vocabulary has increased significantly. He can now speak with one to three word phrases."* Please see an excerpt from the patient's 6 month assessment below:

Appetite	Small improvement
Balance	Moderate improvement
Crawling	Small improvement
Head control	Moderate improvement
Learning disability	Moderate improvement
Limb muscle strength	Moderate improvement
Range of Movement	Moderate improvement
Spasticity	Small improvement

Speech	Significant improvement
Standing up	Small improvement
Swallowing	Small improvement
Trunk muscle strength	Moderate improvement
Walking	Small improvement