

THERAPEUTIC POTENTIAL OF UMBILICAL CORD MESENCHYMAL STEM CELL TRANSPLANTATION IN PATIENT WITH CEREBRAL PALSY: A CASE REPORT

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BACKGROUND

Cerebral Palsy (CP) is the commonest cause of **severe neurological disability in children** caused by non-progressive lesions in the brain. **Current treatments** for CP can improve the functions partially, but a reparative recovery of the damaged brain can not be achieved through these interventions.

UC-MSC (Umbilical Cord Mesenchymal Stem Cell) are easy accessibility, have low immunogenicity, and have the potential for immunosuppression compared with other types of stem cells. UC-MSC also can secrete a variety of nerve growth factors such as VEGF, GDNF, BDNF, and promote axonal growth. This capability of stem cell can stimulate the endogenous stem cells to repair the neurologic defects. In this case report, we investigated the safety and efficacy of umbilical mesenchymal stem cell transplantation for cerebral palsy.



CASE REPRESENTATION

A 13-month-old child patient was diagnosed with CP. The patient was born full-term with a birth weight 3.5 kilogram via cesarean section. When this patient was 7 months old, she experienced seizures with a duration less than 5 seconds, and with a frequency more than 5 times a day. After the seizures, the patient cries. The patient also is not able to control the head, which makes the head fall forth and back. Before therapy, patients still have primitive reflect such as moro reflex, head leg, bubbling and stepping. The patient was treated with Keppra (twice a day) and at the 13-month the patient received administrations of 10 million of UC-MSCs that were infused via intravenous injection 3 times at 3-month intervals.

RESULT AND DISCUSSION

Five domains of early childhood development were tested. After transplantation of UC-MSC, there was **no adverse event recorded**. These results increase evidence that **UC-MSC is safe for clinical application**. In clinical aspect, the patient showed **improvement in gross motor skill, fine motor skill, cognition, and other symptoms such as language competence, emotional changes after UC-MSC infusion**. The patient improvement shown in Table 1

Table 1. Patient Improvement in Five Domains

Domain	Sub-Domain	Description
Adaptive Domain	Self-care	Eat semi-solid food, able to use utensils to feed themselves, trying to crawl, head position and sitting position
Socioemotional Domain	Interaction	Emotional expression, follow a peek a boo game
Communication Domain	Receptive Communication	Visual exploration, cound exploration
	Expressive Communicatin	bubbling
Motor Domain	Gross Motor Skill	Moving hand when see a doll, putting something in mouth, supine to prone rolling and vice versa
	Fine Motor Skill	Hold an object for 1 minute, hands in an open position shen not holding objects, transfer the object from one hand to the other
Cognitive	Attention and Memory	Follow an object for 5 seconf, follow auditory stimuli
	Perception and Concept	Postive Reponse in physical contac and sensory

UC-MSC and some of the biologically active substances they secrete may act as a neurotrophic factor. The results of this study indicate that UC-MSC transplantation is safe and could significantly improve the symptoms of CP.

CONCLUSION

UC-MSC transplantation for patient with CP is a **safe** treatment and showed **effective outcomes**. There is **no adverse event** recorded during treatment. **Improvement in patient** shows that UC-MSC transplantation is a promising therapy for **cerebral palsy**. Further studies with more sample size are needed for better explanation of UC-MSC role in pathophysiology of CP.

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