Beike Stem Cell Treatment for Cerebral Palsy (CP)

What is the disease and how does it affect the body?

Cerebral palsy (CP) is a non-progressive disorder of posture and movement resulting from an insult to the developing brain. It means the brain damage does not worsen, but secondary orthopedic difficulties are common. It is one of the most common chronic disabling conditions of childhood, with a prevalence of 2-4 per 1,000 children aged 3-10 years[1]. The spectrum and patterns of posture and motor impairment are variable but the characteristic signs are: diplegia, hemiplegia and quadriplegia[2]. Additionally, children with CP often have abnormal muscle tone or movement disorders, such as, spasticity, rigidity, hypotonia, dystonia, athetosis, or a mixture of these disorders[1]. In addition to motor disability, children with CP often have other problems including communication, learning disabilities, development delay and musculoskeletal problems such as joint contractures, kypho-scoliosis and hip dislocation. Children and adolescents with CP are also prone to low trauma fractures, which occur for example during normal activities such as dressing and handling[2]. CP is the second-most expensive developmental disability (second to mental retardation) to manage over the span of a person's lifetime, estimated lifetime costs in 2003 dollars are expected to total $11.5 billion for persons born in 2000 with cerebral palsy[1].

The efficacy of current therapy

Thus far, there is no cure for CP. It is important to remember that the earlier treatment begins the better opportunities children have of overcoming developmental disabilities and/or learning new ways to accomplish the tasks that challenge them. Treatment on cerebral palsy may include one or more of the following: physical therapy; occupational therapy; speech therapy; devices assisted modalities (eg, electrical stimulation); orthotics; casting; hyperbaric oxygen; the use of baclofen and botulinum toxin A; surgery (eg, orthopaedic surgery, leg surgery). Nevertheless, there is only some benefit from these therapy [4-5]. Physical therapy, along with orthopedic surgery, has been the mainstay of the rehabilitation management of CP for decades[6]. Traditional therapy approaches have been shown for the most part to be marginally beneficial[7]and demand serious reconsideration by those who still advocate them.

How can stem cells help relieve the disease's symptoms?

Recent studies from multiple laboratories has led to the conclusion that stem cell transplantation has a good result on functional recovery following CP[8-122].
**Improvement:**

Most Cerebral Palsy patients Beike have treated, utilizing the combination of stem cell therapy and rehabilitation, showed visible signs of improvement: regaining motor development and coordination, regaining eyesight, improving mental retardation, increasing muscle strength, decreasing muscle tone of spasticity etc.

However, when discussing improvements, it is important to remember that improvements might greatly differ from one patient to another due to many factors, such as patient’s medical course, physical condition, severity, age and so on. Therefore, improvement cannot be guaranteed.

**Mechanism:**

Currently, Stem cell transplantation is a good way to treat CP patients. There are many kinds of stem cells which show a promising potential for clinical application. The potential mechanisms of stem cell transplantation are (1) reducing the inflammation response [14,15], avoiding secondary brain lesion; (2) differentiating into astrocyte, microglia, oligodendrocyte, neuronland glia cells[16-21], which may be good for myeline sheath, axon regeneration, transmission of nerve impulse; (3) producing the cytonkines and growth factors, such as glia derived neurotrophic factor (GDNF), brain derived neurotrophic factor(BDNF), nerve growth factor(NGF), neurotrohin 3 (NT-3), neurotrohin 4/5 (NT 4/5) [22] that support brain neuroprotection; and(4) generating new vessels growth, thereby increasing the delivery of oxygen and nutrients to injured and hypoxic tissue[23]; and (5) reducing the intrinsic cell apoptosis [24,25].

**References**

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