Cerebral Palsy and Preterm Birth

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Cerebral Palsy

Cerebral Palsy (CP) is a neurodevelopmental condition that persists through the lifespan.

A special committee recently formed a definition of CP so that it met the needs of clinicians and researchers, as well as health officials. The Executive Committee for the definition of Cerebral Palsy presented the following definition,

"Cerebral palsy (CP) describes a group of disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal brain. The motor disorders of CP are often accompanied by disturbances of sensation, cognition, communication, perception, and/or behaviour, and/or by a seizure disorder." [1].

CP is considered a clinically descriptive term rather than an aetiological diagnosis. The traditional classification terms of CP are hemiplegia or diplegia, for the pattern of affected limbs, with the modifier describing the predominant type of tone or movement abnormality (e.g. spastic or dyskinetic).

Anatomical classification

Location	Description
Hemiplegia	Upper and lower extremity on one side of body
Diplegia	Four extremities, legs more affected than the arms
Quadriplegia	Four extremities plus the trunk, neck and face
Triplegia	Both lower extremities and one upper extremity
Monoplegia	One extremity (rare)

What causes CP?

Prematurity and multiple births are two of the leading risk factors for CP, followed by perinatal asphyxia and intrauterine infection; however the direct cause of CP in many cases is unknown. Asphyxia is a condition of severely deficient supply of oxygen to the body that arises from being unable to breathe normally.

Although the cause of CP is often not known a number of factors may play a role, such as;

- Genetic influences,
- Fetal growth patterns,
- Brain maldevelopment,
- Antenatal factors (things that occur before birth), and
- Intrapartum factors (things occurring during labour and delivery).

[2-4]

Spastic motor deficits are the major obvious neurological outcomes of brain injury in the preterm infant. These consist primarily of spastic quadriparesis and characteristically affect the lower extremities more than the upper. Spastic diplegia is most typically associated with preterm birth and is associated with periventricular leukomalacia (brain cysts that can result after a severe brain bleed) [5, 6]. The areas of the brain typically affected are those involved in functions of the lower extremities (legs). Affected preterm babies may have tight leg muscles, poor coordination, and brisk reflexes, resulting in poor balance and difficulty walking. More severe forms of CP can result in affected children having difficulty controlling the neck, chest, and arms and some also have problems with face, tongue, and muscles involved in speech. CP does not mean a baby will have intellectual impairment but some children with CP have learning difficulties. A child's difficulties can change overtime during early infancy and childhood.[4-8]

Some researchers have suggested that hemiplegia and more complex spastic CP result from more extensive brain injuries such as periventricular haemorrhagic infarction or injuries to multiple areas and tend to affect both the upper and lower extremities [5, 6].

When muscle tone changes from too low to too high it is called athetoid CP. Children who have athetoid CP often have difficulty with posture and mobility and also display frequent jerky movements. These children often need a wheelchair.

Ataxic cerebral palsy is the least common type of CP. Ataxic means "without order or coordination" so children with this type of CP find it difficult to balance and it often causes jerky movement and speech.

How is CP diagnosed?

Although a diagnosis of CP is generally made at around 12 to 18 months corrected age, the diagnosis of CP before 5 years is not certain as gross motor function difficulties are not always apparent at early ages [9]. The characteristics of CP can vary from very mild muscle tone abnormalities to severe abnormalities accompanied by intellectual disability.

The criteria used to diagnose a baby with CP will include tests for muscle tone and strength, reflexes, posture and balance, quality and type of movements, ability to achieve normal gross- and fine-motor milestones. Some early motor problems will be monitored and may resolve over time, however abnormalities that do not improve or resolve over time may result in a diagnosis of CP [10].

CP and Preterm infants

The incidence of CP of those born preterm is higher in the smallest and most preterm babies. A number of perinatal risk factors for very preterm infants increase the risk and severity of CP, such as chronic lung disease, grade 3 or 4 Intraventricular hemorrhage (IVH) or periventricular leukomalacia (PVL), and severe retinopathy of prematurity (ROP) [11, 12].

CP is the most common disability of children in Western Europe and the birth prevalence is approximately 2 cases per 1000 live births. Very low birth weight infants are between 20 and 80 times more likely to have CP than infants of birth weights greater than 2500 g. A collaborative network consisting of 16 European centres and using a standard definition of CP (inclusion and exclusion criteria) reported that the prevalence of CP among very low birth weight infants was approximately 72 per 1000 neonatal survivors (i.e. survived longer than 1 month after birth), compared with 1.2 per 1000 among infants born 2500 g or more. Similarly, the French population-

based EPIPAGE study of children born before 32 weeks' gestation reported that the prevalence of CP was approximately 20% at 24 to 26 weeks gestation in comparison with 4% at 32 weeks [7, 12].

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