

# Clinical Spectrum and Risk Factors of Cerebral Palsy in Children

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## Abstract

**Background:** Cerebral palsy is a dynamic disorder of posture and mobility being the “motor manifestation of non progressive brain damage (static encephalopathy) sustained during the period of brain growth in fetal life, infancy or childhood”. Though cerebral palsy is regarded as static encephalopathy, with brain maturity the neurological features of cerebral palsy show change with time

**Aim:** To study the clinical profile of Cerebral palsy and the risk factors associated with cerebral palsy

**Methods:** 100 consecutive cases diagnosed as cerebral palsy were included in the study. Detailed history was taken and thorough examination was done using a predesigned proforma in order to obtain the clinical profile and risk factors of cerebral palsy. Appropriate investigations were done wherever necessary.

**Results:** Spastic cerebral palsy was the commonest physiological type of cerebral palsy (88%). Among the spastic group, quadriplegia was the commonest topographical type (54.54%) followed by diplegia(31.81%). Intranatal causes were the commonest risk factors associated with cerebral palsy (seen in 72% of cases) followed by postnatal causes (seen in 40% cases). 38% cases had more than one risk factor. Subnormal intelligence (42%) and convulsions (36%) were the commonest associated manifestations. Majority were in functional class II (48%) followed by class III (32%).

**Conclusion:** Spastic quadriplegia is still the commonest type of cerebral palsy and intranatal risk factors are the predominant risk factors for cerebral palsy in developing countries due to significant proportion of deliveries occurring at home and lack of widespread availability of adequate neonatal resuscitation facilities and advanced neonatal care.

**Keywords:** cerebral palsy, clinical spectrum, risk factors.

## Introduction

Cerebral palsy is a dynamic disorder of posture and mobility being the “motor manifestation of non progressive brain damage (static encephalopathy) sustained during the period of brain growth in fetal life, infancy or childhood”<sup>[1]</sup>.

Though cerebral palsy is regarded as static encephalopathy, with brain maturity the neurological features of cerebral palsy show change with time<sup>[2]</sup>.

Cerebral palsy is a common problem, the worldwide incidence being 1.5 to 2.5 per 1000 live births. Clinically cerebral palsy can be spastic, atonic,

dyskinetic or ataxic type. The spastic type can be quadriplegic, diplegic, triplegic, monoplegic, hemiplegic or double hemiplegic depending on the type of involvement<sup>[1]</sup>. Cerebral palsy occurs due to various etiologies. These can be congenital, genetic, inflammatory, infectious, anoxic, traumatic and metabolic. The injury to developing brain can occur during prenatal, natal or postnatal period. Predominant insult occurs during prenatal period. Low birth weight and prematurity are the most important risk factors for cerebral palsy. Gestational age and risk of cerebral palsy are inversely proportional<sup>[3]</sup>.

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Apart from motor manifestations cerebral palsy will have associated disabilities like subnormal intelligence, seizures, visual problems, hearing problems, feeding difficulties and behavioural problems etc<sup>[2]</sup>.

Increase in the incidence of cerebral palsy and the change in clinical spectrum distribution of cerebral palsy is likely to be due to advances in perinatology and increasing survival of preterm and sick term babies<sup>[4]</sup>. Aim of the current study is to define the clinical spectrum of CP observed in our institute and to define the risk factors associated with CP as observed in the study.

### Methods

This was a hospital based observational study carried out at Department of Paediatrics, S. N. Medical College and Hanagal Shri Kumareshwara hospital and research centre, Bagalkot between January 2013 to December 2013. 100 consecutive children diagnosed to have cerebral palsy admitted at Hanagal Shri Kumareshwara hospital attached to S.N Medical College, Bagalkot during the period January 2013 to December 2103 were enrolled in the study.

A predesigned and pre tested proforma was used to collect the information. Thorough history was taken and detailed examination was done in order to classify the type of cerebral palsy, to find out the associated abnormalities and to identify the risk factors present in the case. Necessary investigations were done wherever indicated to find out the etiology and to find out the associated problems.

### Results

Among the 100 patients 66 were boys and 34 were girls. Majority (44%) were less than 2 yrs with a mean age of 2.1yrs at the time of presentation. Majority belonged to lower class (54%) followed by middle class (46%). Majority of the patients hailed from a rural area (61%). 60% of the cases were 1<sup>st</sup> born. Delayed milestones was the commonest presenting complaint (90%) followed by convulsions in 15% of patients. Feeding difficulties, excessive crying and drooling were the presenting complaints in 11% of the cases each. Majority were malnourished (82%) with severe malnutrition (grade III and IV) in 10% of cases. 65% of the cases showed microcephaly.

Spastic cerebral palsy was the commonest

physiological type of cerebral palsy (88%). Atonic, ataxic and dystonic types formed the rest of the 12% of cases (Table 1). Among the spastic group quadriplegia was the commonest topographical type (54.54%) followed by diplegia(31.81%). (Table 2). Subnormal intelligence (42%) and convulsions (36%) were the commonest associated manifestations(Table3). Majority were in functional class II (48%) followed by class III (32%). None were in class I (no limitation of activity).

Among the risk factors for cerebral palsy intranatal causes were the commonest (seen in 72% of cases) followed by postnatal causes (seen in 40% cases). 38% cases had more than one risk factor (Table4). Antenatal risk factors maternal anemia, PIH/toxemia and APH were found with equal frequency (in6% cases each). Birth asphyxia (in 40% cases) and preterm/LBW (in 33% cases) were the most common natal risk factors. Neonatal seizures were the commonest postnatal risk factor which was present in 34% of the cases and accounted for 85% of all the postnatal risk factors.

**Table 1. Physiologic type of cerebral palsy**

Physiologic type of cerebral palsy	Percentage (n=100)
Spastic	88%
Atonic/ataxic	7%
Dyskinetic	5%
Mixed	0%

**Table 2. Topographical type of spastic cerebral palsy**

Topographic type	Percentage (n=88)
Quadriplegia	54.54%
Diplegia	31.81%
Hemiplegia	9.09%
Monoplegia	2.27%
Double hemiplegia	2.27%

**Table 3. Associated problems with cerebral palsy**

Associated problem	Percentage (n=100)
Subnormal intelligence	42%
Convulsions	36%
Hearing impairment	15%
Visual problems	12%
Speech delay	8%
Involuntary movements	5%

**Table 4. Risk factors for cerebral palsy**

Risk factor	Number of patients (n=100)	Percentage
Antenatal	21	21
Intranatal	72	72
Postnatal	40	40
More than one risk factor	38	38
Unknown	13	13

## Discussion

Cerebral palsy is often seen as a measure of outcome of obstetric and neonatal care. With improved neonatal care and reduction in neonatal mortality there has not been a corresponding reduction in the incidence of cerebral palsy<sup>[5]</sup>. Spastic cerebral palsy is the commonest physiologic type as observed in most studies from developing countries<sup>[4,6-8]</sup>. Our study findings were consistent with this (Table 1). Among the topographic type of cerebral palsy, spastic diplegia was the most common type as found in studies conducted in developed countries<sup>[9]</sup>. Spastic quadriplegia is the commonest topographic type of cerebral palsy as seen in studies from developing countries by Pratibha Singhi et al, Srivatsava VK et al and Taha SA et al<sup>[4,6,7]</sup>. The probability of survival, gestational age and neurological impairment are interrelated<sup>[9]</sup>. Prematurity is the predominant etiology in developed countries due to increased survival of preterms with resultant predominance of spastic diplegia. Term babies are more likely to survive than preterms in developing countries due to lack of widespread availability of advanced tertiary care. Home deliveries are still common in developing countries and lack of trained personnel and appropriate facilities for neonatal resuscitation makes birth asphyxia still a predominant etiology for cerebral palsy. Hence in developing countries

spastic quadriplegia is still the predominant type. Spastic quadriplegia was the most common topographic type in our study as well (Table 2).

Studies from developing countries show natal risk factors to be the predominant cause for cerebral palsy as seen in studies by Taha SA et al, Puneet Sharma et al and Srivatsava VK et al<sup>[6,7,10]</sup>. In our study natal risk factors were seen in 72% of cases (Table 4). Birth asphyxia continues to be a major risk factor for cerebral palsy in developing countries. A significant proportion of deliveries occurring at home and lack of trained personnel for neonatal resuscitation wherever required may be the etiology for this. 13% of cases showed no identifiable risk factor. The most common presenting complaint in cerebral palsy was delayed attainment of milestones followed by convulsions. This was supported by the similar findings in study by Pratibha D Singhi et al<sup>[4]</sup>. 42% of cases had subnormal intelligence as compared to 72.5% cases in study by Pratibha D Singhi et al and 42.2% in study by Srivatsava VK et al<sup>[4,7]</sup>. Subnormal intelligence is common in spastic quadriplegia and less common with spastic diplegia and dyskinetic cerebral palsy. Higher proportion of cases of spastic quadriplegia as compared to spastic diplegia in our and above quoted studies may be the cause for this high incidence of subnormal intelligence (Table 3). Convulsions, visual problems, hearing problems, involuntary movements, feeding problems and speech difficulties are commonly seen associated with cerebral palsy<sup>[11,12]</sup>.

## Conclusion

Spastic quadriplegia is still the commonest type of cerebral palsy and intranatal risk factors are the predominant risk factors for cerebral palsy in developing countries due to significant proportion of deliveries occurring at home and lack of widespread availability of adequate neonatal resuscitation facilities and advanced neonatal care.

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