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Original Article

Etiological Factors and Clinical Spectrum of Cerebral Palsy in a Tertiary Care Centre

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Abstract
The clinical pattern and etiology of 544 cases of cerebral palsy were studied retrospectively. of these cases,354 cases (65.1%) were Males. Four hundred and ninety seven (91.4 %) cases were of spastic type. Hypotonic, ataxic and athetoid cerebral palsy were observed in 5.5, 1.5 and 1.3 % cases respectively. There was one case each of tremor and mixed type. In the spastic group, quadriplegia comprised the maximum number of cases (34.9%). Diplegia (28.7%) and Hemiplegia (21.9%) were also common. Mental retardation was found in 47.2% cases, while speech impairment was observed in 37% cases. Other handicaps include visual (9%) ,seizure (8.8 %) and auditory handicap (2.9%). The etiological factors were prenatal in 7.7 % cases ,natal in 43.8 % cases and postnatal in 26.1 % cases .More than one etiological factor was observed in 14.5 % cases ,while in 7.9% cases no apparent cause can be found
Cerebral palsy continues to be one of the major crippling disorder in children. The incidence of cerebral palsy in India is 3/1000 live births. Various studies[(2-9)] have been carried out to study the clinical types and the etiology of this disorder. However, the exact etiology of this condition is often not identified. The present study was done to find the clinical profile of cerebral palsy and identify the etiological factors.
Keywords: *Cerebral palsy, Diplegia , Anoxia.*

Introduction

Cerebral palsy (CP) is a diagnostic term used to describe a group of permanent disorders of movement and posture causing activity limitation, that are attributed to non progressive disturbances in the in the developing fetal or infant brain. The motor disorders are often accompanied by disturbances of sensation, perception, cognition, communication, and behavior as well as by epilepsy and secondary musculoskeletal problems. CP is caused by a broad group of developmental, genetic, metabolic, ischemic, infectious, and other acquired etiologies that produce a common group of neurologic phenotypes. CP has historically

been considered a static encephalopathy, but some of the neurologic features of CP, such as movement disorders and orthopedic complications, including scoliosis and hip dislocation, can change or progress over time.[1]

The study is undertaken to determine the various etiological factors and clinical features in cerebral palsy.

Materials and Methods

Five hundred and forty four cases of cerebral palsy attending the pediatrics and physical Medicine and rehabilitation departments of Maharajahs institute of medical sciences hospital Nellimarla between 2010 to 2018 comprised the study group

The cases diagnosed as cerebral palsy including those having "persistent disorder of movement and posture appearing early in life and due to developmental non progressive disorder of brain" [10]

The clinical types were classified as described by Mitchell[3], including the spastic, hypotonic, tremor ataxic and mixed types .The spastic group was further sub classified as monoplegia, paraplegia, hemiplegia, quadriplegia ,diplegia and triplegia .

Etiological factors were grouped as prenatal, natal, postnatal, mixed and unknown. Prenatal factors included various causes resulting in brain damage from conception till onset of labor. Natal causes included various factors operating during birth process while postnatal factors included those affecting the brain after the birth. where there was more than one factor ,they were labelled as mixed .Term babies with birth weight 2.5 kg or more and with normal prenatal ,natal postnatal history were labelled as of unknown origin. Convulsions were considered as a causative factor in the postnatal group where the motar deficit followed the seizure episode. The associated handicaps were also noted

Results

Of 544 cases, there were 354 males (65.1% cases) and 190 females (34.9% cases). The types of cerebral palsy are shown in Table-I.

Table –I : Types of cerebral palsy

Type	No (n=544)	Percentage
Spasticity	497	91.4
Quadriplegia	190	34.9
Diplegia	156	28.7
Hemiplegia	119	21.9
Paraplegia	24	4.4
Monoplegia	5	0.9
Triplegia	3	0.6
Hypotonic	30	5.5
Ataxic	8	1.5
Athetoid	7	1.3
Tremor	1	0.2
Mixed	1	0.2

Mental retardation of various degrees was observed to be the most common handicap (257 cases).Mild moderate and severe were observed in 149, 28 and 76 cases, respectively while four cases had profound degree of mental retardation. Visual defect, seizure and hearing impairment were present in 9,8.8 and 2.9% cases respectively. The visual defects present were strabismus, nystagmus, cataract and bilateral optic atrophy.

Maximum cases were due to natal causes (43.8%) followed by postnatal causes (26.1%). A total of 14.5% cases had more than one etiological factor, while in 7.9% cases there was no known cause. The various etiological factors in the prenatal, natal and postnatal groups are shown in table-II.

Table – II – Etiological Profile in Cerebral Palsy

Prenatal (n=42)	No (%)	Natal (n=238)	No (%)	Postnatal (n=142)	No (%)
Microcephaly	10 (1.8)	Anoxia	133 (24.5)	Encephalitis	65 (12)
Toxemia	7 (1.3)	Prematurity	22 (4.0)	Meningitis	28 (5.2)
Antepartum hemorrhage	5 (0.9)	Labor	18 (3.3)	Convulsion	20 (3.7)
Hydrocephalus	3 (0.6)	Forceps	15 (2.8)	Head injury	13 (2.4)
Drugs	3 (0.6)	Breech	12 (2.2)	Acute infantile hemiplegia	8 (1.5)
Twins	3 (0.6)	Low birth weight	11 (2.0)	Neonatal jaundice	8 (1.5)
Diabetes	2 (0.4)	Postmaturity	9 (1.7)		
Consanguinity	1 (0.2)	Cesarean	8 (1.5)		
Rubella	1 (0.2)	Precipitate labor	5 (0.9)		
Toxoplasmosis	1 (0.2)	Cord around neck	3 (0.6)		
Other maternal infections	6 (1.1)	Face presenstation	2 (0.4)		

In cases where more than one etiological factor was present, the most frequent causes were a combination of prematurity or birth anoxia in association with antepartum hemorrhage, twin, forceps, cesarean section

Discussion

A male preponderance was observed with the male to female ratio being 1.86:1. This is consistent with other reports[4,6]. Of the different types of cerebral palsy, spasticity was the most common. Our finding is in agreement with other workers[3,4,6,7] who have reported spasticity in 62.7% to 80% cases .Among the spastic type ,quadriplegia was most common (34.9%) followed by diplegia (28.7%) and hemiplegia (21.9%) cases. Basu[4] found a high proportion of case with diplegia and tetraplegia while hemiplegia was found in less number of cases .Mitchell (3) found hemiplegia to be most common (37.1%) followed by tetraplegia in 19.2 % cases .O relly and Walentynowicz [7] also found hemiplegia to be most common (26.1%), followed by paraplegia (15.7%),while quadriplegia was found in only 13.5% cases

In our study, hypotonia, ataxia and athetosis were present in 5.6, 1.5 and 1.3% cases, respectively while tremor and mixed type was observed in one case each (0.2%). There was no case of rigidity in our study. O'Reilly and Walentynowicz[7] observed a higher incidence of mixed, athetoid, rigidity and ataxic cerebral plalsy in 12.0, 11.7, 7.2 and 4.9% cases respectively. The incidence of atonia and tremor was low, i.e., 1.1 and 0.3% respectively. Mitchell[3] also observed higher incidence of mixed (9.6%) and athetoid (7.5%) types while ataxia, hypotonia and tremor was observed in 1.7, 2.3 and 1.4% cases respectively. Basu[4] observed hypotonia, athetosis and mixed in 7.1, 5.5 and 2.4% cases respectively while no case of ataxia was found. Makwabe and Mgone[6] observed a higher incidence of athetosis (12%), while hypotonia and mixed type was seen in 4% cases each.

Mental retardation was the most common associated handicap (47.2%). Basu[4] also observed mental retardation to be most common (71.6%) related disorder.

Our of 544 cases of cerebral palsy, majority of the cases (43.8%) were due to natal etiology. Our findings are in accordance with Perlstein[8] and O'Reilly and Walentynowicz[7] who found natal etiology to be the most common cause of cerebral palsy. The incidence of postnatal cause was high (72%) in the study of Makwabe and Mgone[6]. In our study, postnatal causes were observed to be second most common (26.1%). Prenatal causes were least common (7.7%). O' Reilly and Walentynowicz[7] and Perlstein[8], however, found higher incidence of prenatal causes i.e, 38.5 and 30%, respectively. The low incidence of prenatal

causes in our study may be due to lack of facilities for detection of factors in the prenatal period.

Of the prenatal factors, microcephaly (1.8%) and toxemia (1.3%) were the most common etiological factors. Among natal factors, anoxia was the most common (24.5% cases). Infections of the central nervous system comprised the major etiopathogenic factor of the postnatal causes. Encephalitis and meningitis were found in 12% and 5.2% cases respectively. O'Reilly and Walentynowicz[7] in their study found multiple pregnancy and idiopathic factors to be the most frequent causes in the prenatal group, i.e., 5.6 and 1.9% respectively. The most common natal etiology in their study was prematurity (22.7%), followed by anoxia (7.7%). In the postnatal group, encephalitis has been reported to be the most frequent factor (6.9%) which is similar to our observation.

The present study reveals that the natal and postnatal factors are responsible for more than two-thirds of cases of cerebral palsy. These results indicate the need to reinforce the existing maternal and child health services existing maternal and child health services existing in the country. The study also highlights the multifaceted problems relating to cerebral palsy. The child with cerebral palsy may not be confined to other associated handicaps which must be detected at the earliest. This will facilitate a timely and appropriate intervention.

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