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"A Study on Clinical Profile in Patients with Cerebral Palsy"

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ABSTRACT:Aims and Objectives: The aim of this study is to study the clinical profile in patients with cerebral palsy.

Materials and Methods: This study was a prospective cross-sectional study. Sixty cases of cerebral palsy belonging to 4-12 years of age were enrolled. Detailed history, socio demographic information and detailed clinical examination was done in all the selected patients and clinical features were recorded. For assessing the socioeconomic status modified Kuppuswamy classification was used.Based on the history and clinical examination cases were classified according to topographical classification and were graded as per GMFCS and MACS scales.

Results: 60 cases with cerebral palsy 40 (66.7%) were in the age group of 4-6 years followed by 14 (23.3%) cases in 6-9 years age group & 6 (10%) cases in 9-12 years of age group.41 (68.3%) were boys & 19 (31.7%) were girls. 33 (55%) cases belong to upper lower class & 27 (45%) cases belong to lower middle class according to modified Kuppuswamyscale.According to topographical classification 26 (43.3%) were having spastic quadriplegia, 12 (20%) cases were having spastic diplegia and 11 (18.3%) each cases were having spastic hemiparesis and Spastic dyskinetic quadriplegia.Of various comorbidities 48 (80%) were having speech & language impairment followed by 35 (58.3%) were having epilepsy.MACS scoring scale 24 (40%) cases were having level V.GMFCS scoring scale 29 (48.3%) cases were having level V.

Conclusions: The Spastic quadriplegia was the most common clinical form of CP observed in this study. Speech & language impairment was the most common co-morbid condition associated with cerebral palsy.

Keywords: Cerebral palsy, Socio-economic status, Topographical, MACS, GMFCS

I. INTRODUCTION :

According to WHO definition. After eradication of polio, Cerebral Palsy (CP)has emerged as one of the major causes of chronic childhood disability in India [1].Cerebral palsy is a disorder of movement and posture that appears during infancy or early childhood. It is a group of permanent but not unchanging, disorders of movement and /or posture and of motor function which are due to non-progressive interference, lesion or abnormality of the developing/immature brain. The motor disorders of CP are often accompanied by disturbances of sensation, perception, cognition, communication, behaviour, epilepsy and by secondary musculoskeletal problems [2,3,4,5,6,7,8,9,10,11].

The worldwide prevalence of CP ranges from 1.5 to more than 4 per 1000 live births or children of a defined age range [12].The estimated incidence in India is around 3/1000 live births [13].

The aetiology of CP can be identified in only 50% of the cases. Prematurity and low birth weight are the two most important risk factors. Prematurity and the factors responsible for the same, natal causes like intra-partum asphyxia, birth injury and the factors responsible for those, postnatal causes like infections, kernicterus, and other metabolic impairments constitute preventable aetiologies of CP [14].

Children with cerebral palsy not only have to contend with a range of physical problems, such as muscle weakness, stiffness, and clumsiness, they are also 4 times more likely than their peers to experience emotional and behavioural problems [15].

II. AIMS& OBJECTIVES:

To study the clinical profile in patients with cerebral palsy.

III. MATERIALS AND METHODS

This study was conducted with the aim to understand the clinical profile in patients with cerebral palsy.

TYPE OF STUDY: Prospective, Cross-sectional study

PLACE OF STUDY: OPD and IPD of department of pediatrics in a tertiary care center and medical college.

STUDY POPULATION: Study included children aged 4-12 years diagnosed with cerebral palsy attending the OPD and IPD in the of department of

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pediatrics in two years and fulfilling the below mentioned inclusion and exclusion criteria.

SAMPLE SIZE: Total 60 cases

According to the previous records of this hospital, within a month 2-3 patients with cerebral palsy belonging to 4-12 years of age group attend OPD and IPD in Department of Pediatrics. Thus it was estimated that approximately 60 cases would be coming in 2 years of study period. Thus a total of 60 cases were enrolled in the study.

SELECTION CRITERIA:

Inclusion Criteria:

- Patients with cerebral palsy under the age group of 4-12 years.
- Those patients and parents who were willing to give consent and assent.

Exclusion Criteria:

- Children below the age of 4 years and above 12 years.
- Children investigated or known to have metabolic, genetic or other medical illnesses which may mimic cerebral palsy.
- Patients and parents not willing to participate in the study.

INFORMED CONSENT:

Considering the inclusion and exclusion criteria patients with cerebral palsy were selected. The purpose of the study and details of protocols were discussed with their parents and an informed written consent was obtained. After which 60 cases were enrolled in the study.

IV. METHODOLOGY:

- Total 60 children in the age group of 4-12 years, diagnosed with cerebral palsy and brought by parents to the pediatric OPD for their treatment or admitted to any of the pediatric wards as in patients, were selected for the study, applying the inclusion and exclusion criteria and obtaining their parents' consent.
- Detailed history, socio demographic information and detailed clinical examination was done in all the selected patients and clinical features were recorded. For assessing the socioeconomic status modified Kuppuswamy classification [21] was used.
- Based on the history and clinical examination cases were classified according to topographical classification and were graded as per GMFCS and MACS scales.
- A digital weighing scale was used to measure the weight.
- A stadiometer was used to measure the height for children who can stand.

For children who cannot stand because of joint contractures, muscle weakness, scoliosis and/or involuntary movements segmental lengths such as knee length, tibial length or upper arm length were used as alternatives to estimate the height based on published formulae/equations

V. DATA ANALYSIS:

- It was analyzed with the help of software SPSS Statistics version 23.0.
- The qualitative data were expressed by using descriptive statistics such as frequency, percentage and cross tabulation.

VI. RESULTS:

DEMOGRAPHIC FEATURES :

Age (Years)	Number of cases	Percentage
4 – 6	40	66.7
6 – 9	14	23.3
9 – 12	6	10.0
Sex		
Boys	41	68.3
Girls	19	31.7
Birth history		
Preterm Early	18	30
Late	8	13.3
Term	34	56.7
SGA/IUGR/LBW	10	16.7
Perinatal depression	29	48.3
Neonatal Hypoglycemia	1	1.7
Neonatal seizures	12	20
NICU admission	54	90
Neonatal sepsis	5	8.3

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PIH/Eclampsia	10	16.7
Gestational DM	1	1.7
Maternal infection	5	8.3
Socioeconomic status		
Lower middle class	27	45
Upper lower class	33	55
Education		
Illiterate	16	26.7
Primary	23	38.3
Secondary	18	30.0
Higher secondary and above	3	5.0
Topographical classification		
Spastic quadriplegia	26	43.3
Spastic dyskineticquadreplegia	11	18.3
Spatic hemiparesis	11	18.3
Spastic diplegia	12	20.0
Comorbidity		
Visual impairment	14	23.3
Hearing impairment	7	11.7
Epilepsy	35	58.3
Feeding difficulty	25	41.7
Speech &Language impairment	48	80
Limb contracture	30	50
MACS level		
Level I	1	1.7
Level II	12	20.0
Level III	11	18.3
Level IV	12	20.0
Level V	24	40.0
GMFCS Level		
Level I	3	5.0
Level II	12	20.0
Level III	4	6.7
Level IV	12	20.0
Level V	29	48.3

VII. DISCUSSION

This Prospective, Cross-sectional study was conducted at a tertiary care center of a medical college hospital at Pune to assess the clinical profile and quality of life in patients with cerebral palsy.

In this study, it was observed that out of 60 cases with cerebral palsy 40 (66.7%) were in the age group of 4-6 years of age followed by 14 (23.3%) cases in 6-9 years of age & 6 (10%) cases in 9-12 years of age. Study conducted by Pallavi Sharma **et al [20] observed** that cases of less than 2 years (46%) of age, 2–4 years (30%) of age, 4–6 years (12%) of age, 6–12 years (10%) of age and 12–18 years (2%) of age. Another study by Gowda et al[14]in their study of 100 children with CP at a tertiary care teaching hospital observed that age at presentation at the first diagnosis was less than 1 year in 28% and 1–4 years in 65%,5–10 years (6%), and more than 10 years (1%). Study conducted by the D. W. Tessier et al [16] observed that cases between 2-5 year of age were 27 (50.9%) and cases between 6-12 years of age were 26 (49.1%). Study conducted by the Krupa Torne et al [22] observed that case below 1 year was 1 (2.22%), 1-4 years were 1 (42.22%), 5-9 years were 14 (31.11%) and 10 years and above was 11 (24.44%). Study conducted by the Fadwa M. S. Mohammed et al[23] observed that number of cases in the age group of 4-7 years were 42 (64.6%), 8-11 years of age group 14 (21.5%) and cases between 12-15 years of age group were 9 (13.8%).

Although Cerebral Palsy can affect both the genders; it is noticed that boys are affected slightly higher than girls. It was observed in this

study that out of 60 cases of cerebral palsy 41 (68.3%) were boys and 19 (31.7%) were girls. Males are more affected than females because of the protective affects of female sex harmones like estrogen and progesterone[24]. Study conducted by the Pallavi Sharma **et al[20]** observed that among the 100 cases of CP evaluated 59% were boys and 41% were girls. Male sex preponderance has been reported in a number of studies by Tatavartiet al[25]. Johnson[26]in Europe, Laisramet al[27]and Das et al. [19]in India. Study conducted by the D. W. Tessier et al[16] observed that 27 (50.9%) were males and 26 (49.1%) were females participated in the study. Study conducted by the Krupa Torne et al [22] observed that out of total 45 children with cerebral palsy studied 29 (64.44%) were males and 16 (35.56%) were females. Study conducted by the Raj Kumar et al[28] observed that 78.57% males and 21.42% females were participated in the study.

In this study, out of 60 cases 54 (90%) cases required NICU admission, 34 (56.7%) were term babies(37-40 weeks of gestation), 26 (43.3%) were preterm(28-37weeks of gestation) out of which 18(30%) were early preterm(28-34 weeks of gestation) and 8(13.3%) were late preterm(34-37weeks of gestation), 29 (48.3%) were having perinatal depression, 12 (20%) were having neonatal seizures, 10 (16.7%) cases were having history of pregnancy induced hypertention(PIH) & 5 (8.3%) cases were having neonatal sepsis, maternal infection was present in 5 (8.3%) cases & 1 (1.7%) case each having neonatal hypoglycemia& history of Gestational Diabetes Mellitus (GDM). Though prematurity is considered as the most common risk factor for CP now a days, in this study perinatal hypoxia/depression are seen more i.e.,29 cases (48.3%) when compared to number of preterm i.e., 26 cases (43.3%). Study conducted by the PratibhaSinghi et al[18] observed birth asphyxia in 630(51.98%) cases, prematurity in 294(24.3%), neonatal seizures & neonatal sepsis was observed in 326 (26.9%) & 371 (30.6%) cases respectively. Study conducted by the Raj Kumar et al[28] observed that 61.4% cases required NICU admission and one third cases had history of neonatal seizures. Study conducted by the Sharma et al[29] observed 7.7% cases were having PIH, 48.7% cases were having birth asphyxia.

In this study, out of 60 cases 33 (55%) cases belong to upper lower class & 27 (45%) cases belong to lower middle class according to modified Kuppuswamy scale. In this study, children belonging to upper class, upper middle and lower class were not observed this can be explained as most of the patients coming to our hospital belong to middle and lower class. A study conducted in Taiwan by Sung-hui Tseng et al[30] observed that CP prevalence is more in low income families. Some factors like maternal illness, infection, inadequate prenatal care, poor nutrition, alcoholism, and smoking have been suggested to explain the relation between socioeconomic status and prevalence of CP.

In this study, out of 60 cases most of the mothers i.e. 23 (38.3%) completed their primary education followed by 18 (30%) mothers completed secondary education, 16 (26.7%) mothers were illiterate & 3 (5%) mothers completed Higher secondary & above education. Study conducted by the Mona Khalil et al[31] observed that 20 (22.72%) mothers had completed their primary education, 22 (25%) mothers completed secondary 7 (7.95%) mothers competed education above secondary level & 39 (44.31%) mothers were illiterate. A cohort study by IngeborgForthun et al[32] suggested that children of higher- educated parents had significantly lower odds of cerebral palsy. However, in this study illiterate mothers (16) are more as compared to primary educated mothers(23), but when compared to number of cases whose maternal education was higher secondary and above (3) this study's result is in correlation with other studies.

In this study, out of 60 cases 48 (80%) were having short stature, 33 (55%) were having microcephaly, 19 (31.7%) cases belong to SAM category & 9 (15%) each belongs to MAM & normal category. Short stature in children with cerebral palsy is attributed to contractures and poor nutrition. Malnutrition in these children is because of feeding difficulties and gastro-esophageal reflux disease. Study conducted by the Krupa Torne et al[22] revealed that microcephaly was observed in 21(46.67%) patients which was less compared to the present study. Study conducted by the PratibhaSinghi et al [18] observed the microcephaly in 779 (64.27%) cases & malnutrition in 522 (43.06%) cases. Study conducted by the Raj Kumar et al[28] observed that one fourth cases had microcephaly.

In this study out of 60 cases 42 (70%) were first order born, 13 (21.7%) cases were second order born & 5 (8.3%) cases were third order born. These observations are in concordance with a study conducted by the Vykuntaraju K. Gowda et al[14] observed that the birth order one in 65 (65%) cases, birth order two in 26 (26%) cases, birth order three in 8 (8%) cases and birth order four in 1(1%) case. It is noticed that incidence of CP is low on higher order of birth which can be explained by parents with better knowledge and

attitude of parents towards seeking better perinatal care.

In this study, out of 60 cases 26 (43.3%) were having spastic quadriplegia, 12 (20%) cases were having spastic diplegia& 11 (18.3%) each cases were having spastic hemiparesis & Spastic dyskinetic quadriplegia. Ataxic and hypotonic CP were not encountered in this study. This study is consistent with other studies in which spastic cerebral palsy was the commonest motor type and topographically Quadriplegic CP was most common like Pallavi Sharma et al and Das et al. In the Pallavi Sharma **et al**[20] observed that the spastic type was the most common (65%), followed by ataxic (15%), dyskinetic (10%), and mixed (10%) and topographically quadriplegic CP was seen in 69%, diplegia in 23%, and hemiplegia in 8%. Study conducted by the Das et al[19] where Spastic CP was 80% of which, quadriplegia was the major topographic group as it comprised of 43 % of the total cases, followed by Hemiplegia (22%), diplegia (12%), double hemiplegia (2%) and triplegia (1%) were obtained in decreasing order of frequency.

In the present study, out of 60 cases most of the cases i.e. 48 (80%) were having speech & language impairment followed by 35 (58.3%) were having epilepsy, 30 (50%) cases were having limb contractures, 25 (41.7%) cases were having feeding difficulties, 14 (23.3%) cases were visual impairment and 7 (11.7%) cases were having hearing impairment. Study conducted by the Khandekar et al[33] observed that impairment speech 67.6% cases, intellectual problem in 39.0% cases, epilepsy in 23.7% cases, visual impairment in 2% cases, and hearing impairment in 10.2% cases. Singhiet al. [17]reported speech problems (83.7%), visual defect (46.7%), and hearing problem (13.9%).

Manual Ability Classification System (MACS) was designed to classify how children with CP use their hands while handling daily objects. In this study, out of 60 cases 24 (40%) cases were having level V, 12 (20%) cases each having MACS level II & level IV, 11 (18.3%) cases were having MACS level III & 1 (1.7%) case was having MACS level I. These observations can be because, in this study Quadriplegic type of CP is more commonly seen. The above findings differ from observations made in a study conducted by the Marianne Arner et al[34] in which 42.2% cases belong to MACS level I, 22.07% cases belong to MACS level II, 14.4% cases belong to MACS level V, 11.4% cases belong to MACS level III and 8.7% cases belong to MACS level IV.

As per Gross Motor Functional Classification System(GMFCS) in this study, out of 60 cases 29 (48.3%) cases were having level V, 12 (20%) cases each having GMFCS level II & level IV, 4 (6.7%) cases were having GMFCS level III & 3 (5%) cases were having GMFCS level I. The reason for more cases belonging to level V is because of most cases belonging to spastic quadriplegic CP. Study conducted by the Okurowska –Zawada B et al [35] observed that as per GMFCS scale: Level I – 0 patients; Level II – 14 patients; Level III – 10 patients, Level IV – 4 patients, and Level V – 12 patients. Study conducted by the D. W. Tessier et al[16] observed that cases with GMFCS level I were 15 (28.3%), level II were 5 (9.4%), cases with level III were 3 (5.7%), cases with level IV were 8 (15.1%) and cases with level V were 5 (9.4%). Study conducted by the Fadwa M. S. Mohammed et al[23] observed that cases with GMFCS level 1 were 6 (9.2%), cases with GMFCS level II were 3 (4.6%), cases with GMFCS level III were 17 (26.2%), cases with GMFCS level IV were 17 (26.2%) and cases with level V were 22 (33.8%).

In the present study Out of 26 cases of spastic quadriplegia 15(57.7%) cases are due to perinatal hypoxic insult, 8(30.7%) cases because of prematurity, 4(15.3%) cases because of SGA/IUGR, 3(11.5%) cases due to neonatal sepsis, 2(7.7%) cases due to congenital infections. Thus in the current study common cause of spastic quadriplegia was perinatal hypoxic insult followed by prematurity followed by SGA/IUGR, neonatal sepsis, congenital infections. Out of 11 cases of spastic dyskinetic quadriplegia 6(54.5%) cases were due to perinatal hypoxic insult, 5(45.5%) cases due to prematurity, 3(27.3%) cases because of congenital infections, 2 (18.2%) cases because of SGA/IUGR, 1(9.09%) case each because of neonatal sepsis and multiple gestation. In this study it is noted that prematurity was the most common cause seen in spastic dyskinetic quadriplegia followed by perinatal hypoxia. Out of 12 cases of spastic diplegia 10 (83.4%) cases were due to prematurity, 2(16.7%) cases were because of perinatal hypoxic insult, 2(16.7%) cases were because of SGA/IUGR and 1(8.3%) case each due to neonatal sepsis and multiple gestation. In this study it is noted that prematurity is the most common cause in spastic diplegic CP, followed by perinatal hypoxia followed by SGA/IUGR. Out of 11 cases of spastic hemiparesis 6(54.4%) cases were due to perinatal hypoxia, 3(27.3%) cases each due to perinatal stroke and prematurity and 2(18.2%) cases were due to SGA/IUGR. In the current study perinatal hypoxia is commonly seen

in spastic hemiparesis, followed by perinatal stroke and prematurity. In a study by the Das et al [19] it is observed that birth asphyxia were more common in spastic quadriplegia, prematurity and low birth weight more commonly seen in spastic diplegia.

VIII. CONCLUSIONS

The Spastic quadriplegia was the most common clinical form of CP observed in this study.Speech& language impairment was the most common co-morbid condition associated with cerebral palsy.Increasing age is associated with poor quality of life probably because as the age increases patients become more bed ridden and have difficulty in accessing health services.

LIMITATIONS OF THE STUDY

A small sample size and single centre study reduces its generalizability.

It was observed that parents had difficulty in understanding and perception of quality of life of their children due to lower education and socioeconomic status.

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