

Frequency of Various Types of Cerebral Palsy amongst the Admitted Children at a Tertiary Care Hospital and Retrospective Etiologic Analysis on the Basis of History, Examination and Laboratory Support

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ABSTRACT

Aim: To study the frequency of various types of Cerebral Palsy (CP) amongst the admitted cases and retrospective etiologic analysis on the basis of history, examination and laboratory support.

Study Design: Descriptive retro-prospective study

Place and duration of study: Department of Paediatrics, Gujranwala Medical College, DHQ-Teaching Hospital, Gujranwala. Duration of study was one year from 15/03/2015 to 14/03/2016.

Methodology: All the cases of motor and mental delay associated with abnormalities of posture and movement ranging from 6 months to 10 year of age, were admitted from OPD and evaluated for the aims and objectives already mentioned. History and examination was performed according to a Performa followed by CT Scan Brain and EEG.

Results: Number of admitted CP cases during 2015-2016 was 69 out of 14672 total admissions. Male were 38(55.55%) and female were 31(44.92%). Most cases, 38(55.55%) were between 2-5 years of age, 20(28.98%) were less than 1 year and 11(15.94.8%) patients were between 6-10 years. All 69 (100%) patients were developmentally delayed. Spastic type of CP was most common. Among spastic type, quadriplegic were 33(47.82%) and hemiplegic were 15(21.73%). Ataxic, choreoathetoid and hypotonic types were less common. Growth was globally reduced as 53(76.81%) had weight- for- age less than 5th percentile. Associated problems like seizures were noted in 25(36.23%) patients, contractures in 18(26.08%), gait disturbances, ear and hearing problem in 40(57.97%) patients.

Conclusion: Poor antenatal and natal care leading to birth asphyxia and CNS infections are the leading causes of cerebral palsy in our country. Associated problems like mental retardation, physical disabilities due to contractures and seizures etc can be managed by early intervention.

Keywords: Cerebral Palsy, Hemiplegia, Seizures

INTRODUCTION

Cerebral Palsy (CP) defines a group of disorders relating to “motor” development due to non-progressive lesions of the developing brain, often accompanied by disturbances of sensation, cognition and/or a seizure disorder. Cerebral palsies are neither neuropathology nor etiologic entities but a heterogeneous collection of syndromes that are classified according to the type and distribution of the abnormality^{1,2}.

Robert Hutchison (1905) used the term CP in first edition of his lectures on diseases of children. Since then, there has been accumulation of new

pathological and clinical evidences regarding CP. The overall prevalence of CP is 2.5/1000 but may vary from 1-6/1000, making it the most common neurodevelopment motor disability in children^{3,4,5}. Each year in the United States, approximately 278 infants are diagnosed as CP⁶. A similar study conducted in Faisalabad, Pakistan regarding incidence of CP showed that out of a sample of 160 cases with abnormalities of tone, posture and movement, 120(7.5%) were diagnosed as having CP⁷.

Birth asphyxia was considered to be a major risk factor for development of CP but recent studies have shown that in actuality it is due to a myriad of factors. Injury to the developing brain may be prenatal, natal or postnatal. Risk factors now known to play a role in the development of CP include multiple gestation, gender, infection, prematurity and low birth weight along with genetic determinants⁸.

CP can be classified on the basis of type and severity of the motor abnormality along with

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anatomical distribution. The most commonly used classification divides individual cases into spastic (diplegic, hemiplegic or quadriplegic), dyskinetic (choreoathetoid or dystonia), and ataxic or mixed type of CP^{9,10}. Spastic CP presents with upper motor neuron syndrome including spastic hypertonia, hyper-reflexia, extensor plantar responses and clonus along with weakness and fatigability. In spastic quadriplegia, all four limbs are involved after severe hypoxic insult. In spastic diplegia, leg is affected more than arm, and is usually seen in low birth weight babies. Hemiplegic CP involves one half of the body including both upper and lower limbs while other side of the body is spared. It is more common in preterm babies^{10,11}. Dyskinetic CP occurs due to prenatal brain damage following jaundice, asphyxia and prematurity. Ataxic and mixed types of CP are less common. Associated deficits are present in CP patients like mental retardation, specific learning disabilities, visual and hearing impairments, epilepsy, and speech and language disorders¹².

Controversies exist about the best way to help the children with CP. An integrated team of health professionals comprising of Paediatrician, Neurologist, Orthopaedic Surgeon, Physiotherapist, Psychologist, Social Worker and Speech therapist can help to manage a child with CP. The economic burden of CP on parents and society is great and this can be decreased only after good antenatal, natal and post-natal care^{9,13}.

After thorough literature review, it was found that information regarding types, frequency and etiology of CP is very sparse in our country. The objectives of conducting this study was to find out the frequency of various types of cerebral palsy amongst the admitted cases in DHQ-Teaching Hospital, Gujranwala with retrospective etiologic analysis on the basis of history and physical examination with laboratory support.

RESULTS

Total number of cerebral palsy cases admitted during 2015-2016 was 69 out of 14672 total admissions which constituted 0.47%. No patient died during this period. Males outnumbered females, as incidence in boys was 38(55.07%) compared to girls where it was 31(44.92%). Most cases were around 2-5 years of age constituting 38(55.07%) of the cases, second common age was up to 1 year, in which 20(28.98%) of the cases were found. Only 11(15.94%) cases were found in the age group 6-10 years. Mean age of presentation was 2.9 years with a median at 18 months.

All 69 cases (constituting 100%) presented with delayed developmental milestone, so it comprised

the universal finding amongst all the cases. Patients with convulsions formed the second major group comprising 25(36.23%) of the cases followed by pneumonia which made up 20(29.98%) of the cases. Similarly, dysphagia to liquids was present in 18(26.08%) of the cases. Hemiplegia was found in 15(21.73%) of the case. Ataxia and frequent falls during walking were found in 3.7% of the cases. Extreme jitteriness of the whole body associated with excessive crying and irritability was found in one case (1.44%). About 2(2.89%) had viral hepatitis as the presenting feature. Seizures were noticed in early infancy. Drooling of saliva from the month was found in 22.20% of the cases. Patients were found to be drowsy all the times during day and night in 10.14% cases (n=7). Contractures of all four limbs were observed in 18(26.08%) of the cases, while pseudobulbar palsy was found in 15(21.73%) of the cases (n=15), speech in 56(81.1%) of the cases. Spastic gait was present in 5(7.24%) of cases. Similar number of cases i.e., 5(7.24%) of the cases, had scissoring of legs on vertical suspension, 7.4% were found to have nystagmus and bilateral convergent squint separately. Only one case constituting 1.44% had choreo-athetoid movements of the body. Persistence of primitive reflexes including fisting of hands was present in 10(14.49%) of cases while palmer grasp was found to persist in 10.14% of the patients. More reflex was evident in 5(7.24%) of the cases (Table 1).

Developmental milestones were delayed in all of the patients in which neck holding was achieved in 7(21.73%) of the cases between 6-12 months (n=15). Mother recognition between 6-12 months was present in 18(26.08%) of the cases. Smile (both purposeful and automatic) was observed after 6 months in 12(17.39%) of the cases. Sitting between 1-1.5 years developed in 10(14.49%) of the cases. Standing with support was noted in 18(26.08%) of the cases, between 1.5-2 years of age. Only 10(14.49%) were able to walk after 2 years of age. Rest of all the patients did not develop any sort of developmental milestone (even the above mentioned one) after the said duration.

Growth parameters were globally reduced in almost all the cases except few. Weight for age was less than 5th percentile for age in 53(76.81%) of the cases. It was between 5th and 50th percentile in 13(18.84%) of cases. In only one case (comprising 1.44%), it was above 50th percentile for age. Similarly, length for age was less than 5th percentile in 46(66.66%) of the cases. It was between 5th and 50th percentile in 20(28.98%) of cases. Only one case (comprising 1.44%) was above 50 percentile. With reference to head circumference, it was below -2SD (standard deviation) in 63(91.30%) of the cases. It

was between 1SD to 2SD in 6(8.79%) cases (Table 2).

Predominant type of CP was spastic followed by hypotonic and then ataxic. Among subtypes, quadriplegic was the commonest in spastic CP, comprising 33(47.82%) of the cases. Hemiplegic CP was found in 15(21.73% of the cases (n=15) and diplegic CP in 5(7.24%) of the cases. One case each making up 1.44% of the total cases consisted of monoplegic and choreoathetoid types of CP. Atonic CP was found in 7(10.14%) of the cases and only one case 1.44% was labeled as ataxic CP (Table 3).

Antenatal follow up was assessed retrospectively. In 36(52.17%) of the cases, pregnancy was normal and uneventful without any complication, while in rest of the cases, there was some problem pertaining either to mother or fetus. Out of the 69 mothers, 35 mothers (comprising 50.72% of the cases) had no antenatal checkup at all, 28 mothers (comprising 40.57% of the cases) had irregular antenatal checkup. Only 5(7.24%) of the mothers had regular antenatal checkup from qualified doctors of Government Hospitals nearby. It was observed that 35(50.72%) cases were home delivered by the local Dai, TBA or midwives. Babies delivered at private clinic run by LHV_s or doctors were 20(28.98%) of the cases. Government Hospital delivered cases comprised 14(20.28%) of the total patients. Most of the babies were born by SVD (spontaneous vaginal delivery) constituting 61(88.40%) of the cases. Only 8(11.59%) of cases were delivered by C-Sections.

Risk factors observed in the mothers were primigravidity in 13(18.84%) of the patients, ante partum hemorrhage due to placenta previa in 10(14.49%) of the cases and pre-eclampsia in 7(10.14%) of the patients. Risk factors noted in fetus were preterm and low birth weight (below 2.5 Kg) in 5(7.24%) of the cases. Preterm cases were of gestational age of 33 and 36 weeks respectively. One case each of post maturity, breech presentation, transverse lie in the abdomen and twin pregnancy comprising 1.44% of the cases were also present amongst the fetal risk factors (Table 4).

CT Scan brain showed atrophic changes plus additional changes including dilatation of the ventricular system in 33(47.82%) of the cases. Changes coinciding with clinical picture were found in 18(26.08%) of the patients while CT scan was completely normal in 18(26.08%) of cases. EEG recording consistent with epleptiform activity was observed in 12(17.39%) of cases (Table 5).

Table 1: Pattern of presentation (n=69)

Presenting features	n	%age
Delayed developmental milestones	69	100
Convulsions	25	37.03
Pneumonia	20	29.63
Hemiplegia	15	21.73
Speech disturbance	56	81.15
Frequent falls during walks	6	8.79
Hearing loss	10	14.49
Contractures	18	26.08
Spastic gait	9	13.04
Drizzling of saliva	15	21.73
Nystagmus	15	21.73

Table 2: Assessment of Growth Parameters (n=69)

Weight	n	%age
Less than 5 th percentile (for age)	53	77.07
Between 5 th and 50 th percentile	13	18.53
Between 50 th and 75 th percentile	3	4.48
Length / Height		
Less than 5 th percentile (for age)	47	68.10
Between 5 th and 50 th percentile	20	28.98
Between 50 th and 75 th percentile	2	2.89
Head circumference		
Below - 2SD	63	91.50
Above - 2SD	6	8.79

Table 3: Types of Cerebral Palsy (n=69)

Type	n	%age
Spastic		
Quadriplegic	33	48.15
Hemiplegic	15	22.22
Diplegic	5	7.4
Monoplegic	2	2.89
Major type		
Choreoathetoid	2	2.89
Hypotonic / Atonic	7	11.11
Ataxic	1	0.69

Table 4: Risk factors in mothers and babies (n=69)

Parameters	n	%age
Uneventful delivery	36	52.17
No Antenatal check up	35	50.72
Irregular Antenatal check up	28	40.57
Regular Antenatal check up	05	7.24
Home Deliveries	35	50.72
Deliveries at Private Clinics	20	28.98
Deliveries at Government Hospitals	14	20.28
Spontaneous Vaginal Deliveries	61	88.40
Deliveries by C- Sections	08	11.59
Primigravidae	13	18.84
Placenta previa	10	14.49
Pre-eclampsia	7	10.14
Preterm and low birth weight	5	7.24
Post maturity	1	1.44
Breech presentation	1	1.44
Transverse lie	1	1.44

Table 5: CT Scan brain and EEG Changes

Parameters	n	%age
Dilatation of the ventricular system	33	47.82
Normal C T scan brain	18	26.08
Epleptiform activity on EEG	12	17.39

DISCUSSION

Cerebral Palsy (CP) is the commonest physical disability in childhood and proves to be a disorder of movement and posture due to the damage of the immature brain^{8,14}. It is actually a group of syndromes with variable clinical features due to different etiologic factors. Prevalence of CP is around 2.5/1000 population but Indian studies show it to be around 1.24/1000 population as mentioned by Razdan et al in 1994¹⁵. Very little work has been done in Pakistan regarding the prevalence or etiology of CP. One study was conducted in Sheikh Zayed Hospital, Lahore by Maqbool S et al in 1996 and other study was conducted in Faisalabad^{16,17}. In this study, prevalence of CP amongst admitted cases was 0.47% which is in accordance with the result of Chemdra et al¹⁸. Male to female ratio in our study is not quite striking as in Saudi study by Ishaque but mean age of presentation tallies with the same study¹⁹. Presentation at various ages is totally in accordance with the study by Maqbool S. et al¹⁷. Most of the deliveries in our society are carried at home by dais or TBAs (traditional birth attendants) especially in rural setup, so a lot of pregnancies go unsupervised by skilled personnel. Risk factors both in mother and fetus will then be in operation without any surveillance. Same was the situation with our patients, in whom most of the mothers did not seek any medical help during pregnancy. Only one of these mothers had regular antenatal check up. About half of the deliveries were conducted at home by Dias, 29.63% deliveries were conducted at some Private Clinic and only 18.52% mothers were delivered at the hospitals. Similar risks for CP child born to mothers at primary care setting were mentioned by Judith et al²⁰ Gravity of the mother, ante-partum hemorrhage and very young age (Teenage) mothers are considered to be risk factors in mothers and this is supported by Judith, Cummins, Uvibrant and Khalid N. Ishaq in their studies^{20,21,22}. Pre-eclampsia was considered to be a significant feature in a study conducted by Judith but it was found to be present in 10.14% of the patient in present study²⁰ Quite contrast to most of the studies of the West, prematurity and low birth weight (LBW) was found to be a most common fetal risk factor in only 7.4% of the cases in the present study. This is because of very advanced obstetrical and neonatal care in the West, more and more of the preterm and

LBW babies are surviving. Many of the survivors as a result of such intensive care management suffer brain damage and later develop CP^{23,24}. This pattern is very much reflected in the studies by Khalid N. Haq as they noted an increase in the prevalence of CP due to increase in the survival of low or very low birth babies^{19,25}. However, it does not seem to be operative in our study, probably due to higher infant mortality rate and little survival of premature and low birth weight babies in Pakistan. Post maturity, breech presentation, transverse lie and twinning all contribute to prolong labour, resulting in birth asphyxia. Observations in regard to these fetal risk factors were also comparable to above mentioned Western studies.²³ Involvement of birth asphyxia in causation of CP is about 10% by Nelson KB, however, present study recognize it to be around 48.15% which is well above the studies in West. The factors appear to be unsupervised pregnancy and unmonitored delivery by proper health care providers. Supportive results to our study are by those of Srivastara P. K. and a study by Karumuna²⁶.

Tropical countries, including Pakistan always have a threat of various epidemics due to bacterial and viral infections. Study by Pharaoh et al claims 42.48% of cases of acquired CP due to central nervous system (CNS) infection in early infancy.²⁷ Present study matches with that of Tureen et al²⁸. However, in substantial number of cases of CP, cause remained unidentified.

Delayed developmental milestones being the essential component of all the causes were present in 100% of the cases. Patients with convulsions were also quite significant in number and their proportion matches with figures of Sharpie et al²⁹. CP patients have feeding difficulties which were noticed in 29.63%. It matches with the result of Dall and Gabber³⁰. Associated problems like nystagmus, squint and speech disturbances were present to a variable extent in our study and these are slightly higher to a Libyan study which ranked them 8.89%.³¹ Our study mentions about the persistence of the primitive reflexes which help in the early detection of CP. The need to look for this response is emphasized aptly by different authors. Most of the patients in our study were found to be retarded in each respect of growth i.e., height, weight and head circumference and these results are consistent with many studies^{11,32}.

Predominant clinical type of cerebral palsy in our study is spastic quadriplegia which coincides well with the results of Khalid NH¹⁹. An Indian study by Chandra et al found hemiplegic CP on the top of the list. Nevertheless, the clinical pattern of CP cases is within good comparison with studies of similar nature from different parts of the world.

Yield of CT findings in our study was a little less than that of a quite big study over a prolonged period in Israel by Nevo Y³³. However; it was in accordance with that of P. Uvebrant and Sajid M. and reason could be small sample size in our study. Other investigation tool i.e., EEG was specific in 18.52% of our cases which was in accordance with the result of Mauriac et al³⁴.

As Pakistan is a developing country where most of the population lives in rural areas, quite remote from the places where proper medical facilities can be acquired. Literacy rate is also quite low as compared to the West or even other countries of the third world. All these factors lead to lack of awareness of the morbidity of an illness and later on the consequences of a disease on future life of patients. Personal believes, traditions and quackery all contribute to the pathogenesis of disease like cerebral palsy.

CONCLUSION

Poor antenatal and natal care leading to birth asphyxia and CNS infections are the leading causes of cerebral palsy in our country. Spastic Quadriplegic CP comes as a leading clinical type due to global brain damage caused by above mentioned etiological factors. Associated problems like mental retardation, physical disabilities due to contractures and seizures etc can be managed by proper early intervention. More extensive and comprehensive work needs to be done to unravel any mysteries or confusions related to this problem.

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