Original Research Article

A Study to Assess the Clinical Profile and Spectrum of Functional Disability of Patients of Cerebral Palsy

Manish Ranjan[1], Arvind Kumar Yadav[2], Kripa Nath Mishra[3]

[1]Senior Resident, Department of Pediatrics, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India

[2]Senior Resident, Department of Pediatrics, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India

[3]Professor, Department of Pediatrics, Darbhanga Medical College and Hospital, Darbhanga, Bihar, India

Abstract

Aim: The aim of the present study was to assess the clinical profile of patients of cerebral palsy and to assess the spectrum of functional disability.

Methods: The present study was done in the pediatric department of Darbhanga Medical College and Hospital. The present study is the observational study conducted for a period of one year. A total of 100 patients diagnosed with cerebral palsy attending the OPD of the pediatric department were included in the study. All the patients belonged to the age group of upto 12 years.

Results: In the present study, most of the participants belonged to 2-5 years of age and 60% were male. According to nutritional status, majority of the patients belonged to grade III. Among them, 48% were generalized tonic-clonic seizures, myoclonic seizure (30%), febrile seizure (6%), refractory seizure (8%) and status epilepticus (8%). GMFCS score 5 was seen in 28% (mostly quadriplegic), followed by GMFCS level 1, 22% (mostly hemiplegic), others mostly diplegic in level 3 (20%), level 2 and 4 (15%).

Conclusion: In present study, children between 2 to 5 years with male preponderance were mainly noted. Diplegic CP patients were most common and equally distributed between GMFCS 2 to 4. Perinatal factors (asphyxia) were main etiological risk factor. Multidisciplinary CP clinic also provide more satisfaction thus compliance for rehabilitation.

Keywords: Cerebral Palsy, Autism, ADHD, Seizures

Introduction

Disabled children are of great concern to a family as well as to the society. [1] Cerebral palsy (CP) is the most common type of motor disability in childhood. [2] It is found that 10% of the global population has some form of disability from different causes; in India, it is 3.8% of the population. Nearly 15-20% of physically disabled children are affected by Cerebral Palsy. [3] Its incidence in India around 3 cases per 1000 live births; however, being a developing country, the actual figure may be much higher. The prevalence and pattern of Cerebral Palsy varies between different geographical regions, probably because of different etiological factors and different classifications used. [4]

The prevalence was significantly higher in boys than girls (male/female ratio 1.4:1). [5] The motor disorders of Cerebral Palsy are often accompanied by disturbances of sensation, perception, cognition, communication and behavior, by epilepsy, and by secondary musculoskeletal problems. [6] Cerebral palsy (CP) is caused by abnormal development of the brain or damage to the developing brain that affects a child's ability to control his or her muscles. There are several possible causes of the abnormal development or damage. People used to think that CP was mainly caused by lack of oxygen during the birth process. Now, scientists think that this causes only a small number of CP cases. Other causes are LBW, preterm births, jaundice, infections in pregnancy, injuriesetc. [7]

The diagnosis of cerebral palsy should not be made till the age of 2yrs because some minor tone abnormalities which can be present during infancy can disappear as the child grows. But the diagnosis of cerebral palsy can be entertained in children less than 2years of age if the child is severely involved or has supporting evidence (e.g. neuroimaging studies). Although, cerebral palsy is a disease with

abnormalities in tone and posture, predominantly, the children with cerebral palsy would expect to have damage to other parts of the brain as well and this may be manifest as epilepsy, specifically learning disabilities, speech problems or mental handicap. [8] Since CP is a continuing problem, it is important to study and explore the causes and the newer aspects of the condition for proper understanding and management. It causes considerable psychological and financial burden to the caregivers. As there is no cure of CP, hence a need for primary prevention of disease. But unfortunately, the aetiology of cerebral palsy is poorly understood thereby eluding a definitive prevention strategy.

The aim of the present study was to assess the clinical profile of patients of cerebral palsy and to assess the spectrum of functional disability.

Materials and Methods

The present study was done in the pediatric department of Darbhanga Medical College and Hospital, Darbhanga, Bihar, India . The present study is the observational study conducted for a period of one year. A total of 100 patients diagnosed with cerebral palsy attending the OPD of the pediatric department were included in the study. All the patients belonged to the age group of upto 12 years. Children with non-central causes of motor deficits and children with the progressive neurological disorder were excluded from the study.

The three essential features were considered for the diagnosis of cerebral palsy: a) Presence of impairment of neurological function, especially voluntary motor activity, b) The disorder is non-progressive and non-hereditary, c) The disorder is present since birth or early infancy. Cerebral palsy is a clinical diagnosis made by an awareness of risk factors, regular developmental screening of all high-risk babies, and neurological examination.

As in all medical conditions, a systematic approach focusing on maternal, obstetric and perinatal histories, review of developmental milestones, and a thorough neurological examination and observation of the child in various positions such as supine, prone, sitting, standing, walking and running was made.

CP is classified based on the type of neuromuscular deficit into (i) spastic (ii) dyskinetic (inclusive of choreo-athetoid and dystonic) (iii) ataxic (iv) hypotonic and (v) mixed. Further classification of the type of spastic cerebral palsy depends on the topography of involvement. Complete evaluation of a child with CP included an assessment of associated deficits like vision, speech and hearing, oromotor evaluation, epilepsy, and cognitive functioning.

EEG: is indicated in children presenting with seizures, history of neonatal seizures, underlying malformation/ lesion of the brain found on neuroimaging, and during follow-up.

Statistical Methods: Descriptive statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean±SD(Min-Max) and results on categorical measurements are presented in Number (%).Significance is assessed at a 5% level of significance. The following assumptions on data are made, Assumptions: 1. Dependent variables should be normally distributed. Samples drawn from the population should be random. Cases of the samples should be independent.

Results

Table 1: Demographic data and nutrition status

Age	N (Percentage)
<2 years	32 (32%)
2-5 years	40 (40%)
5-10 years	17 (17%)
>10 years	11 (11%)
Gender	
Male	60 (60%)
Female	40 (40%)
Nutritional Status	
Grade I	15 (15%)
Grade II	25 (25%)
Grade III	60 (60%)

In the present study, most of the participants belonged to 2-5 years of age and 60% were male. According to nutritional status, majority of the patients belonged to grade III.

Table 2: Type of cerebral seizures

Type of seizures	Number of children	%
GTCS	48	48
Myoclonic	30	30
Refractory	8	8
Status epilepticus	8	8
Febrile seizures	6	6

Among them, 48% were generalized tonic-clonic seizures, myoclonic seizure (30%), febrile seizure (6%), refractory seizure (8%) and status epilepticus (8%).

Table 3: Gross Motor Function Classification System (GMFCS): HCP-hemiplegic CP, DCP- diplegic CP, QCP- Quadriplegic CP, MCP-Monoplegic CP

GMFCS Score	No of patients	Type of Spastic CP	Mean Age (range) years	Percentage
Level 1	22	9HCP+1MCP	7.5 (5-16)	22
Level 2	15	6DCP+1HCP	7.14 (4-12)	15
Level 3	20	DCP	5.11 (3-9)	20
Level 4	15	DCP	5.71 (2-10)	15
Level 5	28	13QCP+1DCP	3.57 (2-8)	28

GMFCS score 5 was seen in 28% (mostly quadriplegic), followed by GMFCS level 1, 22% (mostly hemiplegic), others mostly diplegic in level 3 (20%), level 2 and 4 (15%).

Discussion

Cerebral palsy (CP) is the most common type of motor disability in childhood. [9] Its incidence in India around 3 cases per 1000 live births; however, being a developing country, the actual figure may be much higher. There are increasing evidences suggesting rise in prevalence of CP. [10] Profile of CP in developing country is also different from developed countries. [11] Modern improved obstetric and advanced prenatal care had resulted in increased survival of low birth weight babies and is associated with an increased proportion of cerebral palsy in these babies. [12] It covers a group of conditions involving a combined disorder of movement, posture, and motor function and may be associated sensory, neurological and musculoskeletal complications. It is a permanent condition, attributed to nonprogressive disturbances that occurred in the developing foetal or infant brain. [13]

In the present study, most of the participants belonged to 2-5 years of age and 60% were male. According to nutritional status, majority of the patients belonged to grade III. Singhi PD et al [3] in their study males formed 67.5% of all cases, Srivatsava VK et al [14] study said males were 65.1%. Disabled children are of great concern to the family as well as to the society. After eradication of polio, Cerebral Palsy (CP) has emerged as one of the major causes of chronic childhood disability in India. Cerebral Palsy has been defined as a group of permanent disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of Cerebral Palsy are often accompanied by disturbances of sensation, perception, cognition, communication and behavior, by epilepsy, and by secondary musculoskeletal problems. [6] The worldwide prevalence of CP ranges from 1.5 to more than 4 per 1000 live births or children of a defined age range. [15]

Among them, 48% were generalized tonic-clonic seizures, myoclonic seizure (30%), febrile seizure (6%), refractory seizure (8%) and status epilepticus (8%). GMFCS score 5 was seen in 28% (mostly quadriplegic), followed by GMFCS level 1, 22% (mostly hemiplegic), others mostly diplegic in level 3 (20%), level 2 and 4 (15%). Higher the GMFCS score and a higher risk of hip dislocation observed some studies, Children with a GMFCS score of 4 or more have a risk of hip dislocation. [16,17] Singhi et al (2002)[3] reported that hemiplegics had a predilection to develop behavioural problems and this was also encountered in this study. Hoffer et al[28] reported that contractures in Cerebral Palsy (CP) were usually in flexion at the hips and knees, and in plantar flexion at the ankles.

Conclusion

In present study, children between 2 to 5 years with male preponderance were mainly noted. Diplegic CP patients were most common and equally distributed between GMFCS 2 to 4. Perinatal factors (asphyxia) were main etiological risk factor. Multidisciplinary CP clinic also provide more satisfaction thus compliance for rehabilitation.

References

1. Shoals MG. Cerebral palsy: Diagnosis, Risk factors, Early intervention and Management of

the spastic child. Advances in Pediatrics. 1st ed. New Delhi: Jaypee Publishers. 2007:623.

2. Sellier E, Platt MJ, Andersen GL, Krägeloh-Mann I, De La Cruz J, Cans C, Surveillance of Cerebral Palsy Network, Van Bakel M, Arnaud C, Delobel M, Chalmers J. Decreasing prevalence in cerebral palsy: a multi-site European population-based study, 1980 to 2003. Developmental Medicine & Child Neurology. 2016 Jan;58(1):85-92.

3. Singhi PD, Ray M, Suri G. Clinical spectrum of cerebral palsy in North India—an analysis of 1000 cases. Journal of tropical pediatrics. 2002 Jun 1;48(3):162-6.

4. Hagberg B, Hagberg G. The origins of cerebral palsy. Recent advances in paediatrics XI. Edinburgh: Churchill Livingstone. 1993:67-83.

5. Arneson CL, Durkin MS, Benedict RE, Kirby RS, Yeargin-Allsopp M, Braun KV, Doernberg NS. Prevalence of cerebral palsy: autism and developmental disabilities monitoring network, three sites, United States, 2004. Disability and health journal. 2009 Jan 1;2(1):45-8.

6. Rosenbaum P, Paneth N, Leviton A, Goldstein M, Bax M, Damiano D, Dan B, Jacobsson B. A report: the definition and classification of cerebral palsy April 2006. Dev Med Child Neurol Suppl. 2007 Feb 1;109(suppl 109):8-14

7. CDC. Cerebral Palsy. Cited on (Dec 2018).

8. O'Shea TM. Diagnosis, treatment, and prevention of cerebral palsy in near-term/term infants. Clin Obstet Gynecol. 2008;51(4):816-828.

9. Sellier E, Platt MJ, Andersen GL, Krägeloh-Mann I, De La Cruz J, Cans C, Surveillance of Cerebral Palsy Network, Van Bakel M, Arnaud C, Delobel M, Chalmers J. Decreasing prevalence in cerebral palsy: a multi-site European population-based study, 1980 to 2003. Developmental Medicine & Child Neurology. 2016 Jan;58(1):85-92.

10. Hagberg B, Hagberg G. The origins of cerebral palsy. Recent advances in paediatrics XI. Edinburgh: Churchill Livingstone. 1993:67-83.

11. Nafi OA. Clinical spectrum of cerebral palsy in South Jordan; analysis of 122 cases. Pediatr Ther. 2011;1:101-4.

12. Pharoah POD, Cooke T, Cooke RWI, Rosenbloom L. Birth weight specific trends in cerebral palsy. Arch Dis Child. 1990;65:602-6.

13. Morris C. Definition and classification of cerebral palsy: a historical perspective. Dev Med Child Neurol Suppl. 2007;109:3-7.

14. Srivatsava V K, Laisram N, Srivatsava R K. Cerebral Palsy. Indian Pediatric. 1992;29(8): 993-6.

15. CDC. Data and Statistics for Cerebral Palsy.

16. Hägglund G, Lauge-Pedersen H, Wagner P. Characteristics of children with hip displacement in cerebral palsy. BMC musculoskeletal disorders. 2007 Dec;8:1-6.

17. Pountney T, Green EM. Hip dislocation in cerebral palsy. Bmj. 2006 Mar 30;332(7544): 772-5.

18. HOFFER MM, KNOEBEL RT, ROBERTS R. Contractures in cerebral palsy. Clinical Orthopaedics and Related Research (1976-2007). 1987 Jun 1;219:70-7.