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Clinical patterns of cerebral palsy with complications and neurodisabilities associated with cerebral palsy

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Abstract

cerebral palsy was a primary neuromotor disorder that affects the development of movement, muscular tone and posture due to injury to the developing brain in prenatal, natal, or post-natal period. cp is non progressive disease but it is changeable features with period. The objective of this study is to identify clinical types of cerebral palsy and neuro-disabilities associated with cerebral palsy patient. Data (2019-2020) on 100 children of cerebral palsy in central teaching hospital in Baghdad analysis include clinical patterns of cerebral palsy and topographic classification of spastic cerebral palsy. also, the complication and neurological disabilities associated with cerebral palsy. In this analysis found most of cerebral palsy patients (84%) were spastic according to topographic classification, (47%) of spastic cerebral palsy was diplegic type. (29%) quadriplegic cerebral palsy and (8%) of hemiplegic cerebral palsy. About neurological complication and disabilities associated with cp, (79%) of cerebral palsy patients had speech disturbance. (53%) had epilepsy, (43%) Micro-acephaly, (32%) of patients had growth retardation, (29 %) had ocular problems, and (15%) of cerebral palsy patients had mental retardation. In conclusions; the most common type of cerebral palsy was spastic cerebral palsy & according to a topographic classification diplegic spastic cerebral palsy was the most common type of Spastic cerebral palsy. About neurodisabilities associated with cerebral palsy, the most common disabilities were speech disturbance and epilepsy.

Keywords: Cerebral palsy, Spastic cerebral palsy, Speech disturbance, Mental retardation, Epilepsy

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Introduction

The definition of cerebral palsy (cp) according to multi studies as primary neuromotor disorder that affects the development of movement, muscular tone and posture [1-3]. Which is accrue due to injury to the developing brain in prenatal, natal or postnatal period [1-3]. Although the initial neuropathologic lesion is non progressive, the children with cp may develop range of secondary conditions over time that will variably affect their functional abilities [4,5].

CP defined as group of permanent disorders of movement and posture, causing activity Limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or immature brain. the motor disorders of cp are often accompanied by disturbance of sensation, perception, Cognition, Communication and behavior, by epilepsy and by secondary musculoskeletal problems [1]

CP is characterized by heterogeneity of risk factors, underlying specific etiology, clinical features, severity of functional limitation associated and secondary conditions, treatment options and evolution of the condition over the lifespan of the individual [6-8]. Shevell (2019) has explored the argument for a consideration to view cp as Spectrum disorder rather than a discrete unitary clinical condition [9].

The neurologic impairment of motor system in children is characterized by spasticity, dyskinesia, hypotonia and ataxia [2, 10, 11].

Mixed presentation is not uncommon. Hypotonia, with or without associated spasticity - generally truncal hypotonia and spasticity of extremities, are also seen. Based on clinical findings, cp is generally classified as spastic, dyskinetic, and hypotonic or Mixed [12, 13]. 35% of children with cp have spastic diplegia, which is the most common clinical phenotypes of cp [15].

Spastic diplegia is due to damage to the immature oligodendroglia between 20 and 34 weeks of gestation [2,3,15]. The most common neuropathologic finding seen on neuroimaging is periventricular leukomalacia [2, 3,15].

In spastic diplegia, both the motor Corticospinal and the thalamocortical pathways are affected [2, 3]. Most children with spastic diplegia have normal cognitive function and good prognosis for independent ambulation, spastic quadriplegia Comprises 20% of children with cp and this clinical phenotype is associated with premature birth and neuroimaging show severe periventricular leukomalacia and multi-Cystic Cortical encephalomalacia [3,4, 10, 14, 15].

Spastic quadriplegia is associated with Significant functional limitations, cognitive, epilepsy, visual impairment, and other associated conditions [2,3, 10, 11, 12]. The children with Spastic quadriplegia have poor prognosis for independent ambulation, 25% of children with up. Have spastic hemiplegia [14, 15]. Spastic hemiplegia is most commonly seen in infants born at term and most cases are due to in utero or perinatal stroke [15]. Most children with spastic hemiplegia have normal Cognitive abilities, are able to maintain.

independent ambulation and a high level of functional abilities [2, 3, 13]. Extrapyramidal cp Comprises Chore athetotic, dystonic, dyskinetic clinical phenotypes and Comprises 15% Cases of cp [15]. Most cases are seen in infants born at term and associated with hypoxic ischemic encephalopathy Kernicterus, neuro metabolic or neurogenetic disorder [2]. Children with extrapyramidal cp have a higher incidence of associated condition-cognitive deficit, seizures, behavioral problems sleep disturbances, visual impairment or hearing impairments [16].

Classification of cp

cp has traditionally been classified on the basis of the type of motor disorder (first classification) that a clue with variable numbers and descriptions of types the revised classification now in use defines & main) categories of motor disorder, as following:

- Spastic (70-80%)
- Dyskinetic (10-15%)
- Ataxic (<5%)
- Dystonic [18]
- Atonic [19]

- Mixed type

Spastic cases of Cerebral palsy further classified (8 second classification) according to involvement of extremities (20), called (topographic are dominancy) as following:

1. Diplegic (30-40%)
2. Quadriplegic (10-15%)
3. Hemiplegic (20-30%)
4. Monoplegia
5. Double Hemiplegic
6. Triplegic

Disabilities associated with Cerebral palsy [21]:

The severity and the incidence of disabilities and impairments in cerebral palsy increased with Severity of motor impairment, it has been reported that cerebral palsy patient associated with Severe motor impairment up to 70% have epilepsy. 50% have severe intellectual impairment, 55 % will be non-verbal, 25% will be blind, and 3% had deafness (sensory neural).

Patient and methods

This study was done in central teaching hospital of children in Baghdad started from 1st of December 2019 to 1st of December & 2020 on 100 patients with cerebral palsy. We use prospective case control study by choose 2 population Case study population which is diagnosed with cp. and control population which is normal children without cp.

Age of patients 1-14 years attended neurological outpatient clinic or had been admitted to neurological ward at central teaching hospital of children, this hospital was tertiary center of pediatrics which had neurological ward and outpatient neurological clinic a daily along the week with 3 pediatric neurologists. In our study we use data collected by using preform for collecting information on relevant risk factors and type of cp. With disabilities associated with cp., also information about control group. more over data on relevant sociodemographic characteristics were assessed and collected the information taken from any parent or Caregiver which include demographic data such as name, age, sex, residence, gestational age, mode of labor, prenatal natal and postnatal complication which is associated with cp. Also, the information about examination of patient and controlled group to assessed type of cp and degree of motor handicap with associated neurological disability as epilepsy, mental retardation, ocular problem, deafness, motor dysfunction, Speech disorder, growth retardation Microcephaly, Joint contracture. Statistically analysis to date of our study by Computer software, chi-square test was used to test significance of associations. P - value < 0.05 was considered significant statistically.

Result

According to clinical patterns classification of cp. eighty-four percent of cp patients was spastics, and 3% of cp patients was atonic, also the ratio of dyskinetic cp was 2% which the patients had choreatic

and athetoid movement. ataxic 1% which is rare Cases occur due to Cerebellar hypoplasia and or any abnormalities in Cerebellum. 10% of cp Case were mixed type which had multi-pictures of cp.

according to a topographic classification of Spastic cp 84%, we found 47% of spastic cases were diplegic Cp which is the most common type of Spastic cp., most of those patients without neurological disabilities. While 29% of spastic cp were spastic quadriplegic cp, most of them had neurological disabilities. 8% of those spastic cp were hemiplegic types.

most of patients with cp had neurological disabilities which effect on the lifestyle of patient's school and sociality all patients of cp had delayed motor milestone as gross and fine motor function the most common neurodisabilities associated with cp was Speech disturbance 79% also 53% of cp Case had epilepsy of different type of seizures, hosted of patients Controlled by antiseizures treatment and that's intractable to treatment. We do EEG to them & most of them has finding of different types of epilepsy. then Microcephaly 43% of cp Cases and 32% of cp patients had growth retardation.

29% of cp patients had ocular disorders the most common ocular disorder was squint 19% mostly convergent squint, 4% of patients had Blindness, and 4% had nystagmus, and 2% of cp patient had cataract other clinical disabilities associated with cp were dysmorphic features 22%, deafness 4%, which was Sensorineural deafness mostly. Joint Contracture 21% and 15% of cp patients had Mental retardation which is mostly in quadriplegic spastic cp.

Tablet 1.

Disabilities associated with cp

No.	Disabilities	Cases in number
1.	Delay milestone	100
2.	speech difficulty	79
3.	Epilepsy	53
4.	Microcephaly	43
5.	Growth retardation	32
6.	Ocular disorder	29
7.	Dysmorphic Features	22
8.	Joint contractures	21
9.	Mental retardation	15
10.	deafness	4

Tablet 2.

Ocular disorder associated with cp

No.	Ocular disorder	Cases
1	Squint	19
2	Nystagmus	4
3	Blindness	4
4	Cataract	2

Discussion

Our analysis reported many types of cp and the most common type of cp was spastic cp which reported 84% of children with cp. which is higher than report estimated that spastic cp 70% [22]. This ratio of our study was lower than ratio in other reports [23]. but nearly same ratio in the others 85%. (25,26). Our Study found 3% of hypotonic cp was hypotonic which is agree with studies done in Australia 3%. But there is disagreement about hypotonic cp is truly [25, 26].

Also our study reported ataxic cp 1% and dyskinetic cp (which includes dystonia and choreoathetosis) 2%. There ratio is less than ratio reported in other studies ataxic 4%, dyskinetic 7% [25, 26]. According to topographical classification of spastic cp diplegic cp was most common type of spastic cp 47%, quadriplegic cp 29%, and 8% hemiplegic cp, these results were agreeing with reported ratios by Erkin et al. (2008). and disagree with other studies done in Australia which found the most common type of spastic cp was hemiplegic cp 40%-60% [25] and study done (Sahu Suvanand et al) & which found the most common spastic cp was quadriplegic cp 86.4% [12].

There were many neurological disabilities associated with cerebral palsy in our analysis. the most common neurodisabilities were speech difficulty 79%, and epilepsy 53%. about speech problems rather studies found. Over 50% of children with CP exhibiting some sort of speech impairment [28] speech production involves respiration together with laryngeal, velopharyngeal and articulatory movements, and any of these functions may be hampered in CP.

Motor disorders affecting speech include dysarthria /anarthria and dyspraxia/apraxia of speech. Dysarthria is characterized by slow, weak, imprecise and /or uncoordinated movements of the speech musculature. Apraxia/dyspraxia is characterized by a disturbance in the motor planning and programming of speech movements [29]. Speech ability is related to the type of CP. Gross motor function, the presence of mental retardation and the localization of brain mal-development and lesions. An association between the type of CP and speech ability was reported by Andersen et al in the Norwegian study [30].

Ninety percent of the children with unilateral spastic CP had normal or understandable speech, while 97% of the children with dyskinetic CP had severely impaired or no speech [39]. The results of speech problem in our study were disagree with results of other studies done by Anderson et al [30] which found 28% of cp patients associated with speech problems. And study done in Indonesia which found 40% of cp patients associated with speech difficulty [31].

About association of epilepsy with cp we found 53% of cp cases had epilepsy. So, epilepsy is very important clinical problem in children with cp. it is the incidence ranges from 15% to 55- 60 % and according to some authors, even up to 90- 94% of children with cp [32-36] epilepsy in children with cp. Is mostly revealed in the first (4-5) years of life usually in the 1st year of life [38].

The incidence of epilepsy varies depending on the type of cerebral palsy. Epilepsy is usually observed in Tetraplegia 50-94%; hemiplegia 53-50%; but it seldom affects children suffering from diplegia and the ataxic type of cp. 16-27% there are many studies concerning risk factors as for epilepsy in children one of significant with factors is mental retardation [39]. It is estimated that more than 50% of children with cp and mental retardation suffer from epilepsy.

In our study found 15% of cases of cp, had Mental retardation and (8 Cases) of those Mental retardation associated with cp had Epilepsy. So, it's agreed with reports of previous studies. the proportion of children with cp and intellectual impairment varies between 40%, and 65% [40, 42] the frequency of intellectual disability has been reported to be relatively higher in association with quadriplegia poor gross motor function, and epilepsy [40]. Ocular problems also one of neurological disabilities associated with cp patient which is 29% of cp patients in our study. These results agree with results of lupis et al. study [31] and disagree with results of (Anderson et al., [30]. Study 2008 which found only 5% of cp patients had visual problems. 15% of cp patient in our study had mental retardation which is lower than results seen by AL-Karagully study [43] which found 62.4% of cp patient hand mental retardation.

Recommendations

1. Early diagnosis and classification of types of cp is important to start treatment to avoid Complications and neuro disabilities associated with cp.
2. Rehabilitation Center with multidisciplinary team should be established at community level for optimal servicing delivered to child with cp to reduce morbidity, allow comprehensive follow up, improve living and provided with which requires additional team input for visual, hearing, developmental assessments Speech and occupational therapists and psychologists.
3. Early diagnosis and proper management of as completion of cp is very important per epilepsy to avoid cognitive deterioration and mental retardation.

Conclusions

1. Most common type of cp was spastic cp. and regarding to topographical classification of cp the most common type of spastic cp was diplegic cp.
2. The most common neurological disabilities associated with cp. was speech difficulty and the epilepsy.

The authors declare that there is no conflict of interest.

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