Epilepsy in Saudi children with cerebral palsy

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ABSTRACT

Objective: To study the clinical characteristics, electroencephalographic and computerized axial tomography profile in Saudi children with cerebral palsy who suffer epilepsy in a university referral center.

Methods: A total of 113 patients with cerebral palsy and epilepsy was seen (67 boys, 46 girls) with an over all mean age 5.3 years (range .2-12 years) during the study period (January 1998 - December 1999). They all had clinical evaluation and standardized electroencephalographic studies interpreted by the same examiner.

Results: The main clinical features were language delay (61%), hypotonia (45%), hypertonia (38%), and behavioral abnormalities (41%). Seizure types included generalized in 96 (85%), and partial and complex partial with or without secondary generalization in 17 (15%). None of the patients had simple partial seizures. The generalized seizures were non-convulsive in 4 patients (3.5%), tonic/clonic 73 (65%), atonic 3 (3%), myoclonic 16 (14%), and mixed 2 (2%). Inter-ictal electroencephalographic abnormalities were epileptiform activity, generalized in 65 (57.5%) and focal 18 (16%), slow-wave activity in 58 (51%) and hypsarrythmia pattern in 6 (5%). Only 9 patients had normal electroencephalogram. The cranial computerized tomography findings were normal in 11.5%. The main abnormalities were cerebral atrophy (65%), hydrocephalus (8%) and agenesis of the corpus callosum (8%).

Conclusion: The pattern of seizure type in patients with cerebral palsy and types of electroencephalogram abnormalities electroencephalogram and cranial computerized tomography are comparable to the results from studies in other clinical settings and environments.

Keywords: Epilepsy, cerebral palsy, electroencephalogram, computerized tomography.

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Epileptic seizures are defined as paroxysmal, stereotyped, recurrent episodes of sensory, motor, autonomic or behavioral disturbances that is the result of brain pathology. The overall incidence of epilepsy is 49 per 100,000, of these patients approximately 5 to 8% have some form of static neurologic deficit present since birth.[1,2] Such a percentage is probably higher in patients with combined mental retardation and other neurologic deficits.[3] Various studies have shown that epilepsy occurs in 15 to 60% of children with cerebral palsy,[4] a chronic disability of cerebral origin characterized by aberrant control of movement or posture appearing during the early childhood and absence of progressive disease.[5] Most studies indicate that epilepsy in these patients is characterized by an earlier age of onset with generalized, focal or multi-focal seizures.[6] Zafeiriou et al has recently described the prevalence and characteristics of epilepsy in a population of children with cerebral palsy.[7]

The aim of the present study is to examine the clinical characteristics, electroencephalographic (EEG) and computerized axial tomography (CT) profile in Saudi children with cerebral palsy (CP) who suffer epilepsy in a university referral center.

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Methods. This is a retrospective study of children up to the age of 12 years seen at neurology clinic or admitted into the wards at King Fahd Hospital of the University (KFHU), Al-Khobar with suspected cerebral palsy, focal or generalized seizures, and reviewed by the investigator from January 1998 to December 1999 were accepted for the study. Neonates and non-Saudis were excluded from the study. For all the patients a precoded data form was completed to collect the relevant history, neurologic examination, EEG and CT findings. The data was entered into a standard data base file using personal computer and analyzed using the statistical package for social sciences program (1997 edition).

Results. A total of 113 patients with cerebral palsy and epilepsy were seen (67 males, (mean age 4.9 years; range 0.25-12 years) and 46 females (mean age 5.6 years, range 0.2-11.3 years). The salient clinical features are shown in Table 1. None of the patients have simple partial seizures. Inter-ictal EEG abnormalities were seen in 104 (92%). The most common EEG abnormalities were epileptiform activity, generalized in 65 (57.5%) and focal in 18 (16%) and only 9 patients (8%) had normal EEGs. Other abnormalities included slow wave activity in 58 (51%) and hypsarrythmia pattern in 6 (5%). Cranial CT and magnetic resonance imaging (MRI) was obtained in 52 (46%) patients. Of these 6 (11.5%) were normal. The main neuroimaging (CT, MRI) abnormalities are seen in Table 3.

Discussion. Epilepsy occurs in 15-60 % of children with cerebral palsy.[4] The latter serves as an important prognostic indicator in patients with epilepsy.[8] The association of these two disorders may be either genetic or environmental. Some studies have suggested that genetic factors play an important rule in this association.[9,10] However, in a study of 1079 twins the risk of developing cerebral palsy and non-febrile seizures was similar in monozygotic and dizygotic pairs suggesting other factors may play an additional rule.[11]

The preponderance of generalized tonic-clonic seizures in our study is similar to the studies carried out by Hadjipanayis et al[12] in a group of 323 patients with cerebral palsy and Kaushik et al[13] assessing 50 CP patients. In a similar study, Forsgren et al[14] found that the generalized tonic-clonic seizures were the most common seizure type occurring in 204 of 299 patients. In the current study, partial seizures with or without secondary generalization occurred similar to the findings of Steffenburg et al[8] where out of 90 children with cerebral palsy and epilepsy 20 patients had partial seizures. The preponderance of generalized seizures in patients with cerebral palsy may reflect the widespread nature and severity of underlying cerebral pathology. The high frequency of epileptic abnormality on EEG in our study is

Table 1 - Types of neurologic abnormalities in 113 Saudi children with cerebral palsy and epilepsy.

Neurologic abnormalities	Total	Frequency*
Language delay	69	61
Hypotonia	55	45
Hypertonia	43	38
Behavioral disordres	46	41
Cerebellar abnormalities	15	13
Hearing loss	8	7
Vision loss	3	3
Movement disorders	4	3.5
Musculo-skeletal disorders	3	3

*More than one abnormality exists in the same patient

Table 2 - Seizure classification in 113 Saudi patients with cerebral palsy.

Classification	Percentage	Number
Generalized seizures	85	96
Absence	3.5	4
Tonic-clonic	65	73
Atonic	3	3
Myoclonic	15	16
Mixed	2	2
Partial seizures	15	17
Simple (Motor or Sensory)	0	0
Complex	1	1
Partial with secondary generalization	14	16

Table 3 - Cranial CT and MRI finding in patients with cerebral palsy and epilepsy (N=52).

Findings	CT No (%)	MRI No (%)
Normal	6 (11.5)	6 (11.5)
Cerebral atrophy	34 (65)	34 (65)
Hydrocephalus	4 (8)	4 (8)
Agenesis of corpus callosum	4 (8)	4 (8)
Porencephaly	2 (4)	2 (4)
Generalized ischemia	1 (2)	1 (2)
Subarachnoid cyst	1 (2)	1 (2)

CT - Computerised Tomography, MRI - Magnetic Resonance Imaging

similar to the findings of others.[15,16]

Cranial CT abnormalities seen in 88.5% in this study is slightly higher than the 67% reported by Sussova and colleagues.[16] However the most common CT abnormality in the current study, as well as in other studies was cerebral atrophy followed by hydrocephalus.[17,18] The most common MRI abnormality was cerebral atrophy and its frequency is similar to that reported by Okumura and others.[19]

This study shows that the pattern of seizure types in patients with CP and types of abnormalities in cranial CT and MRI are comparable to the results from studies in other clinical settings and environments.

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