

Language Disturbances and Epileptic Seizures (*)

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ÖZET

Epilepsi Nöbetleri ve Dil Bozuklukları

Epilepsili çocuklarda karşılaşılan bilişsel ve davranış bozukluklarının da nöbetler kadar önemli olduğu görüşü giderek daha çok sayıda klinisyen tarafından kabul görmektedir. Özellikle epilepsi nöbetleriyle birlikte açığa çıkan dil yetisindeki bozukluklar veya epileptik ensefalopati olarak bilinen tablolarda görülen mental bozulmalar daha fazla dikkati çekmektedir. Nöbeti olan veya olmayan toplam 414 konuşma sorunu olan hasta üzerinde yapılan bu çalışma ile epilepsi ve dil arasındaki incelikli ve karmaşık ilişkilere dikkat çekilmek istenmiştir. Bu çalışmada, epilepsi nöbetlerinin 3 yaş öncesi başlaması, hastaların beraberinde davranış ve diğer nöropsişik defisitlerinin olması dil bozukluğunun şiddetini göstermiştir. Nöbetlerin seyrek olması ise daha hafif nitelikte konuşma bozuklukları ile ilişkili bulunmuştur. Konuşma bozukluğu olan hastaların EEG'lerinde bilateral paroksizmal deşarjların ve zemin aktivitesi bozukluğunun daha sık görülmesi ise bu hastalarda nöbet olma olasılığı ile ilişkili yorumlanmıştır.

Anahtar kelimeler: epilepsi, dil, çocuk

SUMMARY

Despite the reluctance of some clinicians, management of some childhood epilepsies include the cognitive and behavioural spheres to deal with. It is not infrequent to see a sudden or gradual worsening in the language functions of epileptic children during the course of so-called epileptic encephalopathies. This study which included 414 patients with some language disturbance and with or without seizures emphasized the importance of clinical studies which were concerned with the intricate relations between epilepsy and language. In this study seizure onset before the age of 3 and the presence of concomitant behavioral and neuropsychological deficits were associated with the severity of language disorder while the infrequency of seizures were related to the mild involvement of language. The presence of bilateral paroxysmal discharges and abnormal background activity in the EEGs of patients with language disturbance were interpreted as they were more likely to have seizures.

Key words: epilepsy, language, child

INTRODUCTION

Although the complex relationship between epilepsy and language disorders is not well understood, the coexistence of epileptic seizures and language problems in diverse clinical pictures such as Lennox-Gastaut, Landau-Kleffner, tuberous sclerosis and autism is a well known fact ^(1,2,3). In regard to the interrelationship between epilepsy, language and behaviour, fundamental questions still remain unanswered. Faced with so many intricately linked variables, clinicians are often reluctant to accept the idea that management of some childhood epilepsies are

in close relationship with the cognitive and behavioural spheres; but they also know that they frequently encounter such problems when assessing children with epilepsy who have cognitive or behavioural symptoms or when evaluating a child with cognitive or behavioral symptoms who have seizures or when evaluating a child with a language or behavioral disorder whose laboratory investigation reveals an abnormal electroencephalogram (EEG). Therefore it is useful to study the relationship between language and epileptic seizures so as to yield a practical and deeper understanding of this relationship which in turn permits the clinician to make rational decisions regarding diagnosis, treatment and prognosis as well as surgical intervention. This study aims to explore, some of the relations between epileptic seizures and language disturbances with respect to variables defined below.

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MATERIAL and METHOD

Fourhundred and fourteen patients, 274 (66 %) male; 140 (34 %) female were retrospectively selected according to the criterion of having a language problem of varying severity from a total number of 3509 patients followed up in the out-patient clinics of Child Neurology for 2-7 years. Peripheral causes of language disturbance and stuttering were excluded while autistics and cases with developmental language problems (as defined two years below the expected level of their age) were included. Most cases had (predominantly expressive) mixed type of language disorder. Of 3509 patients forty-two patients who had had some initial language delay later seemed to catch up with their peers were not included in the patient group.

First of all two groups of patients were categorized according to the absence or presence of epileptic seizures in their medical history. Of those 414 patients, 181 (44 %) had epileptic seizures (mainly secondarily generalized) of either idiopathic origin or symptomatic of varying etiologies. The seizure and non-seizure groups were compared in relation to the variables such as concomitant behavioral and neuropsychological problems, precipitating factors as possible responsible antecedent events and presence of parental consanguinity, neurological examination, EEG and radiologic findings. Concomitant behavioural problems included hyperactivity, aggression, self-mutilation and nocturnal enuresis. Concomitant neuropsychological problems were defined as delay in walking (after 18 months) or toilet training (after 5 years old) as well as deficits in the other higher cortical functions such as visuospatial skills or praxis. As possible responsible factors in the antecedent, asphyxia, CNS infection, birth weight under 1500 gr or moderate to severe head trauma were noted. EEG abnormalities were analysed in relation to the background activity, paroxysmal features and lateralization of sharp and/or slow waves.

Then the whole patient group were divided into two other groups according to the severity of language disturbance. The first group, comprised of patients with severe language disturbance included 120 (29 %) patients. 80 male (66.6 %) and 40 female (33.3 %) while the group with mild language disturbance included 294 patients (71 %), 194 (55 %) male and 100 (34 %) female. The children who did not speak at all by the age of 3 years old, and who did not combine any two words at the age of 5 were included in the moderate to severe group, while other patients who had relatively less problems in the field of language were included in the mild group. Same variables mentioned above are employed for the comparison of two groups. The data related to the comparison of groups were statistically evaluated according to the chi-square analysis.

RESULTS

Results were summarized in tables 1, 2, 3, 4, 5. In all groups, there were more boys than girls (2:1). Consanguinity of parents was present in 30 % of patients. Concomitant behavioral (40 %) and neuro-

Table 1. Patient biodata.

N of pts	: 414 (274 male (66 %); 140 female (34 %))
N of pts under 7	: 222 (53.6 %)
N of pts 7 and over 7	: 192 (46.4 %)

Table 2. Comparison of groups with seizures to without seizures.

Variables	G seizure + (n of pts)	G seizure - (n of pts)
	181 (43.7 %) 118 m (65 %) 63 f (36 %)	233 (56.3 %) 156 m (67 %) 77 f (33 %)
Parental consanguinity (Total N:126; 30.6 %)	56 (44 %)	70 (56 %)
Behavioural disturbance (Total N: 165; 39.8 %)	72 (44 %)	93 (56 %)
Concomitant neuropsych. prob. (Total N:236; (57 %)	120 (66 %)	116 (49 %)
Precipitating factors (Total N:168; 41 %)	57 (32 %)	111 (48 %)
Positive neurol. exam. (Total N:221; 54 %)	91 (50.2 %)	130 (56 %)
Radiologic findings (Total N: 69; 49 %)	41 (51.2 %)	28 (45.2 %)
N of CT and/or MRI (Total: 142)	80	62
Total n of EEG	200	113
N of normal EEGs	49	52
N of pts with normal EEG	98	38
Abn background activity	38 (19 %)	5 (4 %)
Paroxysmal activity	47 (23.5 %)	5 (4 %)
Lateral. to the right	41 (20.5 %)	15 (13.2 %)
Lateral. to the left	19 (9.5 %)	8 (7 %)

psychological deficits (57 %) were prominent in all groups. Pathologic events in the antecedent were seen in 41 % of patients. The neurological examination was abnormal in 54 % of patients. Radiologic abnormalities were detected in 49 % of patients. Except the relative frequency of bilateral paroxysmal discharges ($p < 0.001$) and abnormal background activity ($p < 0.001$) in the EEGs of epileptic patients differences between seizures and non-seizure groups according to the other parameters were statistically insignificant.

Considering the severity of language disturbance,

Table 3. Type of seizures.

Secondary generalized	: 86 (47.5 %)
Primary generalized	: 28 (15.4 %)
Unilateral	: 24 (13.6 %)
Complex partial	: 19 (10.5 %)
Myoclonic	: 17 (9.4 %)
Other	: 7 (3 %)

Table 4. Comparison of group with mild and severe involvement of language function.

	number of patients	
	Severe (120)	mild (294)
Presence of seizures	50 (41.7 %)	131 (44.55 %)
Parental consanguinity	38 (31.7 %)	88 (29.93 %)
Precipitating factors	55 (45.83 %)	113 (38.43 %)
Positive neurol. exam.	77 (64.16 %)	144 (48.97 %)
Concom. neuropsych. def	82 (68.33 %)	154 (52.38 %)
Radiologic abn.	21 (48.83 %)	48 (48.48 %)
Normal CT and / or MR	22	51
Behavioral disturbance	61 (50.8 %)	104 (35.37 %)
Total n of EEGs	79	234
N of pts without EEG	60	130
Normal EEGs	25	73
Abnormal EEGs	35 (29 %)	101 (34 %)
Background abnormality	9 (11 %)	34 (14.5 %)
Lateral. to the right	14 (17.72 %)	42 (17.94 %)
Lateral. to the left	2 (2 %)	25 (10.68 %)
Paroxysmal discharges	18 (22.78 %)	34 (28.33 %)

Table 5. The comparison of mildly and severely affected patients with respect to seizure variables.

	severe L-A (120) (n of pts) 50 epileptic	mild L-A (294) (n of pts) 131 epileptic
Type of seizures		
generalized	19 (38 %)	48 (37 %)
partial	31 (62 %)	83 (63 %)
Age at onset of seizure		
> 3	16 (32 %)	11 (8 %)
3 and 5	18 (36 %)	50 (38 %)
over 5	16 (32 %)	70 (54 %)
Frequency of seizure		
> 1-3 / month	16 (32 %)	27 (21 %)
1-3 / month	15 (30 %)	36 (28 %)
< 1-3 month	19 (38 %)	68 (51 %)
Status epilepticus	8 (16 %)	16 (12 %)

L-A: Language-affected

the concomitant neuropsychological problems ($p < 0.001$) and behavioural problems ($p < 0.005$) were significantly higher in the group with severe language disturbance in comparison to the mildly af-

ected group. Except the rate of lateralization to the left in the EEGs of mildly affected group ($p < 0.025$), which was significantly higher than the severely affected group, the results according to the other parameters were found insignificant ($p > 0.05$). The number of epileptic patients in the group with mild language involvement and left lateralization in the EEGs, was two fold of non-epileptic ones.

Regarding the relations between seizure parameters and severity of language involvement, seizure onset before the age of 3 seemed to correlate with severe language disturbance ($p < 0.001$), while after the age of 5, the language functions were less disturbed. Relative infrequency of seizures were significantly associated with mild language involvement while seizures frequent more than 1-3 per month, despite the statistical insignificance ($p > 0.05$), were related to the severe language involvement. Though statistically insignificant ($p > 0.05$), status epilepticus was more frequent in the severely affected language group.

DISCUSSION

Epilepsy, regardless of its cause and severity, potentially creates a host of neuropsychological and behavioral consequences for the affected child^(4,5). Early recognition and precise delineation of these problems will be useful for the management of these patients as well as the rehabilitation of them.

In this study concomitant behavioral and other neuropsychological problems which were found to be more frequently associated features of patients with language disorder who had epileptic seizures, were also related to the severity of language disturbance. Presence of such additional problems in language delayed children indicated the presence of epilepsy and an increased risk of having more severe language involvement. Those patients with severe language difficulties had also more abnormal neurological examination in comparison to the other group. It is not possible to make precise explanations for these results with such a retrospective study but it is likely to be multifactorial on the basis of involvement of larger areas in the brains of patients with behavioural and multiple neuropsychological deficits^(6,1).

The patients with seizures had significantly more bilateral paroxysmal discharges and disturbed background activity in their EEGs. Those EEG features, rather than isolated sharp elements, indicated the greater incidence of epileptic seizures in the patients with language problems. No other significant relation between seizure and non-seizure groups with respect to the variables studied were found.

The lateralization to the left seen in the EEGs of patients with mild involvement of language may be explained as the direct effect of epileptic discharges on the language dominant hemisphere, for the 17 (68 %) of 25 patients who had lateralization to the left in their EEGs had epileptic seizures. The severely affected patients did not display such an EEG feature, maybe because the language disorder in those cases was rather a part of general cognitive dysfunction, while epilepsy, might have contributed to the language dysfunction in the milder cases though the role of epileptiform abnormalities on language function is still somewhat controversial^(7,8,9).

Regarding the seizure variables, our results were in accordance with the literature⁽¹⁰⁾. Secondarily generalized partial seizures were more prevalent in the severely involved patients and the onset of seizures before the age of 3 was found to be correlated with an unfavourable prognosis; probably it was because a child might cease to make further progress or lose whatever language he or she had in association with onset of seizures or paroxysmal EEG abnormalities interfering with the development of language at different stages in its acquisition at a critical period (age 1-5) and the result might be a failure to acquire that function, or an aberrant development of the function⁽¹⁾. The patients with seizure onset after age 5 had lesser involvement of language functions. Other variables studied did not give any significance.

Recently the number of computerized studies on the specific role of epileptiform discharges on cognition and behavior, has increased^(12,13). As the relations between epileptic seizures and language problems involve more complex mechanisms it is necessary to make more sensitive and well-planned prospective studies which will explore the relationship of epilepsy and language and behaviour particularly regarding the etiologic factors, the effect of anti-epileptic drugs. Site and degree of brain dysfunction, the seizure type and type of language disability as well as other precisely measured seizure variables and effects of pharmacological intervention.

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