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Brain & Development 33 (2011) 504–507

BRAIN & DEVELOPMENT
Official Journal of the Japanese Society of Child Neurology

www.elsevier.com/locate/braindev

Original article

Epilepsy in pervasive developmental disorder without brain MRI abnormalities

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Received 27 February 2010; received in revised form 28 August 2010; accepted 30 August 2010

Abstract

Background: Epilepsy has been reported in patients with pervasive developmental disorder (PDD), with an incidence ranging from 5% to 40%; however most of the studies included patients with brain magnetic resonance imaging (MRI) abnormalities (e.g., tuberous sclerosis) and patients with epilepsy whose seizure onset was in the first year of life. *Methods*: We retrospectively examined 67 patients (45 males, 22 females) with PDD and epilepsy, who did not have brain MRI abnormalities. Patients who had seizures in the first year of life were excluded. We divided the patients into two groups: group A included 34 patients with an IQ < 50, and group B included 33 patients with an IQ $\geqslant 50$. *Results*: The median age of epilepsy onset was higher in group A than group B (8.8 vs. 5.2 years, $P < 0.01$). Only one patient (3%) in group A and nine patients (27%) in group B were classified with generalized epilepsy ($P < 0.05$). At the last observation, 16 patients (47%) in group A and 25 patients (76%) in group B were seizure-free for $\geqslant 1$ year (not statistically significant). *Conclusion*: The relationship between PDD and epilepsy may be different between patients with lower (group A) and higher (group B) IQs in patients who do not have brain MRI abnormalities.

Keywords: Epilepsy; Pervasive developmental disorder; Autism; Mental retardation; MRI abnormalities

1. Introduction

Since the first description by Kanner in 1943, epilepsy has been reported in patients with pervasive developmental disorder (PDD), and its incidence has been reported to range between 5% and 40% [1–5]. The medical literature reports differing characteristics of epilepsy in PDD with respect to onset of seizure, seizure type, epileptic syndromes, and seizure outcome. Most of the studies have included patients with brain magnetic resonance imaging (MRI) abnormalities (e.g., tuberous sclerosis) and patients with epilepsy whose seizure onset was in the first year of life. It has been reported that children who have seizures in the first year of life, such as infantile spasms, tend to develop autism and mental retardation (MR) [6,7].

The purpose of this study was to describe the epileptic characteristics of patients with PDD who do not have brain MRI abnormalities and whose epilepsy onset was after 1-year-of-age. We divided these patients into two groups, those with severe MR (IQ < 50) and those with mild MR (IQ $\geqslant 50$).

2. Patients

The Shiga Medical Center for Children (SMCC) is a medical and rehabilitation center for both epileptic children and handicapped children in Shiga Prefecture. We studied 67 patients (45 males, 22 females; median age at study, 13 years and 7 months; range, 5–30 years) with

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doi:10.1016/j.braindev.2010.08.014

PDD complicated by epilepsy but without brain MRI abnormalities, who were initially observed and followed-up during 2008 at SMCC. Patients with seizure onset in the first year of life or with Rett syndrome were excluded.

We included patients who were diagnosed as autistic disorder, Asperger's disorder, and PDD not otherwise specified (PDD-NOS) according to the DSM-IV-TR by the pediatric neurologist (TM). The diagnosis of PDD was based on detailed clinical examinations and comprehensive parental interviews, considering developmental history and symptoms. To satisfy the PDD-NOS criteria, a child needed to meet at least four symptoms of the DSM-IV-TR criteria in three areas (i.e. impairment in reciprocal social interaction, impairment in communication, and restricted/stereotyped behavior/interests) and exhibit abnormal or impaired development before 3-years-of-age. Fifty-eight patients were diagnosed or had been diagnosed with PDD at the time of seizure onset. Nine patients were diagnosed with PDD at follow-up observations. The median follow-up from the first to the last observation was 7 years and 5 months (range, 1 year and 6 months to 15 years and 3 months).

Epileptic features were determined according to the Revised Classification of Epilepsies and Epileptic Syndromes [8].

3. Methods

Medical records related to cognitive level evaluated with the Japanese version of the Wechsler Intelligence Scale for Children-Third Edition [9] or the Kyoto scale of psychological development (*K*-test) [10,11] were obtained. The *K*-test is one of the most widely used developmental tests in Japan and its developmental quotients (DQs) have been considered to be equivalent to IQs, so we have used the term IQ to refer to either IQ or DQ. Based on these cognitive level testing results, we divided the 67 patients into two groups: group A, patients with an IQ < 50, and group B, patients with an IQ $\geqslant 50$. Epileptic features included age of onset, seizure type, antiepileptic treatment, seizure outcome, and history of febrile seizures.

The Mann–Whitney *U*-test was used to compare the medians of the two unpaired groups. The chi-square ($\chi 2$) test was used for comparisons between the two groups.

4. Results

Group A included 34 patients (25 males, 9 females) and group B included 33 patients (20 males, 13 females). The clinical data of the two groups are presented in Table 1.

The median age of epilepsy onset was 6 years and 2 months among all patients. The median age of epilepsy onset was higher in group A than group B (8.8 vs. 5.2 years, $P < 0.01$) (Fig. 1). Ten patients (29%) in group A had their first seizure below the age of 6 years, whereas the number was 23 (70%) in group B ($P < 0.01$).

Only one patient (3%) in group A and nine patients (27%) in group B were classified as having generalized epi-

Table 1
Clinical profiles of the two groups.

	Group A (IQ < 50) 34 patients	Group B (IQ $\geqslant 50$) 33 patients
Gender		
Male	25	20
Female	9	13
Male/female ratio	2.8:1	1.5:1
Cognitive level		
$70 \leqslant$ IQ	–	16
$50 \leqslant$ IQ < 70	–	17
$35 \leqslant$ IQ < 50	5	–
IQ < 35	29	–
Developmental disorder		
Autistic disorders	32	7
Asperger's syndrome	0	8
PDD not otherwise specified	2	18
Epilepsy classification		
Generalized*	1	9
Partial	33	24
Seizure type		
Typical absence	0	1
Atypical absence	1	5
Myoclonic	0	3
Partial	33	24
Febrile seizures		
(+)	11	9
(−)	23	24
Frequency of seizures at the last observation		
Seizure-free $\geqslant 1$ year	16	25
Yearly	8	8
Monthly	5	0
Weekly	3	0
Daily	2	0

PDD, pervasive developmental disorder.
* $P < 0.05$.

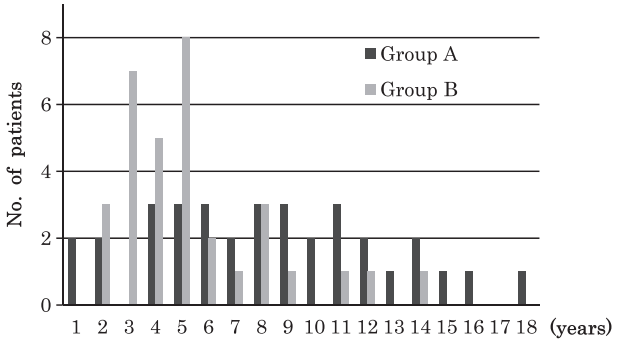

Fig. 1. Distribution of the onset-age of epilepsy.