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Original article

Benign myoclonic epilepsy in infancy: neuropsychological and behavioural outcome

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Abstract

Benign myoclonic epilepsy in infancy (BMEI) is a rare syndrome of idiopathic generalized epilepsies with onset below 3 years of age. It has been reported that BMEI is associated with a good prognosis, however, recently some studies suggest less favourable neuropsychological outcome. We report a long-term follow-up of seven patients with BMEI. Seizure outcome and neuropsychological, cognitive, and behavioural evolution were discussed for each of them. At the end of follow-up, 86% of children showed neuropsychological and intellectual disorders: two children had mental retardation, three patients achieved a borderline IQ and one normal but low IQ. All but one displayed neuropsychological disabilities including fine motor skill deficits, attention deficits, and language impairment and learning disorders. Our clinical data and the previous reports suggest that the early onset of the seizures may be one of the main factors of the illness giving rise to a less favourable outcome. Additional interacting factors such as delayed start of treatment, and efficacy of the drugs may play an important role, too. We believe that BMEI does not exert, different from some epileptic encephalopathies, a quick destroying effect but may interfere with the growth of developing functions, which results in long-term neuropsychological disabilities.

Keywords: Benign myoclonic epilepsy in infancy; Neuropsychological outcome; Behavioural outcome; Onset age

1. Introduction

Benign myoclonic epilepsy in infancy (BMEI), delineated by Dravet and Bureau in 1981 [1], is a rare syndrome of idiopathic generalized epilepsies (IGE) with onset below 3 years of age. There is a prevalence of males with a ratio of approximately 2–1. About 30% of affected children has a family history of epilepsy or febrile convulsions (FC).

The seizures occur in healthy infants, and are characterized by brief generalized myoclonic jerks involving the axis of the body and limbs. They usually last 1–3 s and are isolated, although sometimes they occur in cluster. BMEI is never associated with other seizure types, but rare FC may precede or follow the onset of myoclonic attacks.

Ictal EEG shows brief generalized 3 Hz spike-wave (SW) or polyspike-wave (PSW) discharges increasing during drowsiness. Seizures are well controlled by sodium valproate (VPA) but relapses have been reported in few patients later in adolescence requiring reintroduction of the drug [2]. Although BMEI prognosis has been considered favourable, some studies suggest a less favourable neuropsychological outcome [2–5].

The disagreement on long-term outcome of BMEI induced us to investigate the seizure-associated factors that may be involved in cognitive and behavioural development. We report a long-term follow-up of seven patients with BMEI. Seizure outcome and neuropsychological, cognitive, and behavioural evolution were discussed.

2. Patients and methods

Seven children (three males and four females) with a mean age of 8 years 1 month (range: 5 years 8 months–10 years 2 months) were enrolled among 1110 epileptic patients who were referred to the Child Neuropsychiatry Clinic of University of Palermo between January 1992

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and December 2002. To be included in this study, patients were required to have a diagnosis of BMEI according to the criteria reported by the Classification of Epilepsies and Epileptic Syndromes [6], normal developmental milestones at first hospital admission, and lack of markers suggesting a pre-existing encephalopathy. The average duration of the follow-up was 6 years 9 months (range: 4 years 9 months–9 years 2 months). We investigated the following data: (a) family history, personal past history and postnatal troubles; (b) psychomotor development; (c) neurological examination; (d) brain CT scan; (e) age at onset of myoclonic seizures (MS); (f) clinical and EEG features of seizures; (g) antiepileptic treatment; (h) interval between seizure onset and starting antiepileptic drugs (AED); (i) seizure and EEG evolution; (j) long-term neuropsychological, cognitive, and behavioural outcome.

Neuropsychological profiles were constructed on the basis of different tests, depending on the characteristics of each patient. The Brunet-Lézine scale was used to assess the psychomotor development. The Wechsler Preschool and Primary Scale of Intelligence (WPPSI) and the Wechsler Intelligence Scale for Children-Revised (WISC-R) were administered to determine verbal and performance IQ. We used the Bender Visual Motor Gestalt Test (BVMGT as scored by Santucci for Italian sample) to measure visual-motor integration and the oral language test (TVLO as scored by Ferrari et al. for Italian sample) to assess language abilities. Recalling sentences (RS) and spontaneous speech (SS) subtests were used to assess expressive syntax. The token test (TT) and visual naming (VN) subtests were used to measure receptive syntax and vocabulary.

Although no behavioural questionnaire was administered, we paid close attention to possible emotional or behavioural problems (such as anxiety, shyness, hyperactivity, aggressiveness, irritability, oppositional conduct, and attention problems) during clinical follow-up. Informations were obtained by parent and teacher interviews and by clinical observations.

3. Results

Clinical data of our patients are reported in Table 1. Four patients (57%) had a family history of epilepsy and FC. No patient had notable past history and postnatal troubles. Three infants experienced FC before onset of MS. At the first hospital admission, findings of neurological examination and psychomotor development were normal in all patients. Brain computed tomography scan in two patients (cases 1 and 2) did not show any abnormality. Mean age at onset of MS was 15 months (range: 7 months–35 months). Myoclonic jerks occurred at 7 months of age in two children (29%), between 11 and 14 months in three patients (43%), at 22 and 35 months in two patients (29%), respectively. The seizures were characterized by myoclonic jerks involving mainly the upper limbs in all patients, and in some cases they provoked nodding with upward gaze deviation, bending of the body axis and flexing or reduction of tone in the lower limbs. MS occurred many times a day and were never associated with other seizures. Ictal EEG recordings showed generalized SW and/or PSW discharges synchronous with myoclonus (Fig. 1), and interictal EEG showed no abnormalities (Fig. 2). Two children (29%) had myoclonus triggered by tactile or acoustic stimuli. VPA was effective in all patients but one who needed clobazam add-on. The average interval between seizure onset and VPA administration was 2 months 15 days (range: 18 days–5 months). The patients became seizure-free within a mean period of 7 months 15 days (range: 10 days–28 months) with disappearance of generalized SW and/or PSW discharges

Table 1
Benign myoclonic epilepsy in infancy: clinical characteristics

No. pat.	Sex	Family history	FC before MS start	Age at MS onset	Age/ psychomotor development at first hospital admission	AED	Interval between MS onset and start of AED	Interval between start of AED and seizure control	Age at seizure control	Duration of follow-up
1	F	−	−	7 months	9 months/ normal	VPA + CLB	2 months	28 months	37 months	7 years 7 months
2	F	FC	+	7 months	11 months/ normal	VPA	4 months	10 days	11 months	4 years 9 months
3	M	EPI	–	11 months	15 months/ normal	VPA	5 months	6 months	22 months	7 years 6 months
4	M	–	+	12 months	12 months/ normal	VPA	18 days	3 months	16 months	9 years 2 months
5	F	–	–	14 months	15 months/ normal	VPA	1 month	6 months	21 months	7 years 2 months
6	M	FC	+	22 months	22 months/ normal	VPA	1 month	4 months	27 months	5 years 2 months
7	F	EPI	–	35 months	36 months/ normal	VPA	2 months	1 month	38 months	6 years 2 months

FC, febrile convulsions; EPI, epilepsy; MS, myoclonic seizures; AED, antiepileptic drug; VPA, valproic acid; CLB, clobazam.