

The Influence of Early Seizure Control on Outcome of Cerebral Palsy

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Abstract

The aim of the study was evaluation of influence of quality of epilepsy care on long-term outcome of patients with cerebral palsy (CP). In patients with CP and epilepsy, accurate clinical and EEG investigation with early identification of seizure type and epilepsy syndrome, adequate treatment and EEG follow-up during physical therapy results in higher rate of seizure control, increases possibility of realization of monotherapy and continuous physical therapy which in turn significantly improves motor and mental outcome.

Keywords: *cerebral palsy, epilepsy syndrome, seizure type, electroencephalography, physical therapy, anticonvulsants*

Introduction

Cerebral palsy (CP) is the most common physical disability in childhood. Although CP characterized by their motor dysfunction, almost always it is accompanied by other disorders of cerebral function. About one-third of patients develop seizures, which most often have their onset in the first 2 years of life. The incidence is greater in spastic quadriplegias and acquired hemiplegias, and lowest in mild symmetric spastic diplegia and mainly athetoid cerebral palsy. The most common seizures are partial with secondary generalization.

The purpose of our study is to evaluate influence of quality of epilepsy care on long term outcome of patients with cerebral palsy.

Material and Methods

A total 396 patients with CP were included in study. They were divided into two groups:

group 1: patients were treated during 1995 -1997, group 2: patients were treated during 1997-2000.

The management scheme was the same for both groups. All patients were examined and managed by multidiscipline team including child neurologist, psychologist, physical therapist, and speech therapist. Practically all patients underwent MRI investigation.

The patients of group 2 additionally underwent detailed EEG investigation with evaluation of seizure type and epilepsy syndrome before treatment. The length of follow-up was 2 years.

During active physical therapy several procedures of EEG were performed for early identification of unfavorable progression of epilepsy patterns. Mental development was assessed twice before treatment and at the end of observation.

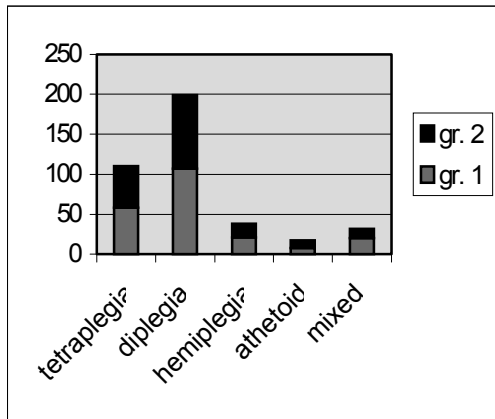


Fig.1 Types of CP in groups.

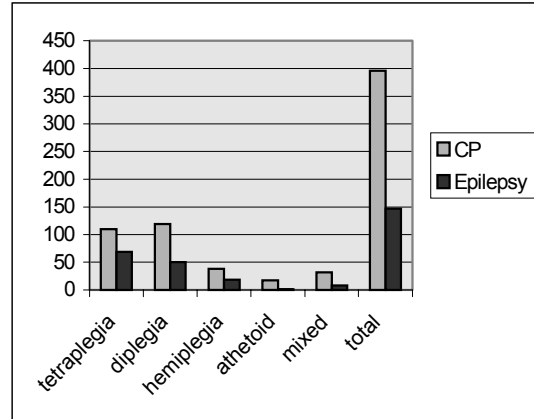


Fig.2 Incidence of epilepsy in different forms of epilepsy.

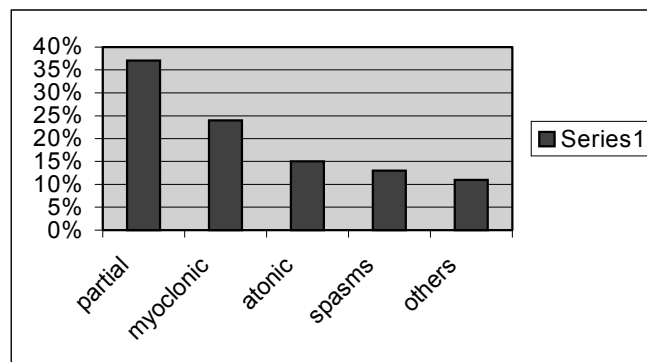


Fig.3 Incidence of different seizure types.

Results

Distribution of patients by forms of CP was similar in both groups (*Tab.1*). Most frequent forms of CP were tetraplegia and diplegia.

The incidence of epilepsy in total was 37%. The incidence according to forms of CP is given on *Fig.2*. Epilepsy was most familiar for patients with tetraplegia and hemiplegia. From 110 children with tetraplegia 69 had seizures, while among 199 patients with diplegia, only 50 patients. The incidence of epilepsy for patients with diplegia was 25,2%, tetraplegia - 63%, hemiplegia - 50%, other forms - 10,5%.

Types of seizures: Most frequent seizure types were: partial seizures with or without secondary generalization - 37%, myoclonic - 24%, atonic seizures - 15%, spasms - 13%, absences - 2% and mixed types - 9%. Incidence of different seizure types is given on *Fig.3*.

The seizure types differed according to the forms of CP. In patients with tetraplegia most frequently were observed myoclonic seizures and spasms, while in hemiplegic group partial seizures. Generalized seizures were more typical for patients with tetraplegia. Absences appeared rarely and mostly in diplegic group.

The age of onset of epilepsy had a close correlation with the form of CP. In children with tetraplegia epilepsy started significantly earlier, than in other patients (*Fig. 4*).

The median age of onset in tetraplegia group was 8 months, in hemiplegic group 42 months.

The first group of patients was evaluated retrospectively. The diagnosis of epilepsy with definition of seizure type and syndrome if possible was established in this group lately. Median period between onset of seizures and correct diagnosis - 2,5 years. Misdiagnosis and inadequate treatment occurred in

57%. Inadequate treatment included inadequate drug or combination of drugs and inadequate dosage. Seizure control in this group was 66%. Relapse rate was high and in 56% active physical therapy was interrupted due to relapses of seizures. Consequently mobility index in this group was lower.

The second group of patients underwent detailed long term EEG investigation before treatment. In 92% of cases seizure type and syndrome were evaluated. Median period between onset of seizures and adequate treatment was 5 months. Seizure control - in 80% of cases.

Patients with active epilepsy or significant epileptic patterns on EEG were excluded from physical therapy. Serial EEG helped in early identification of unfavorable progression of epilepsy patterns.

The interruption of physical therapy due to seizure relapses occurred in 16% of cases. Principle of monotherapy was realized in 71% of cases, while in

group 1 the possibility of monotherapy existed only in 36% of cases. Mental development was assessed in both groups before treatment, at the end of treatment and at the end of follow-up. Mental development was qualified according to the Bayley Scale of Infant Development as optimal, suboptimal and nonoptimal. In total patients with early seizure control had significantly better rating scale, than those without. At the end of follow-up regression of mental development appeared in 35% in group 1, 17% - in group 2.

Comparative data of main parameters is on *Fig.5*.

Conclusions

In patients with CP and early seizures, accurate clinical and EEG investigation with identification of epilepsy syndromes, adequate treatment and EEG follow-up, result in a higher rate of seizure control; the possibility of continuous physiotherapy significantly improves motor and mental outcome.

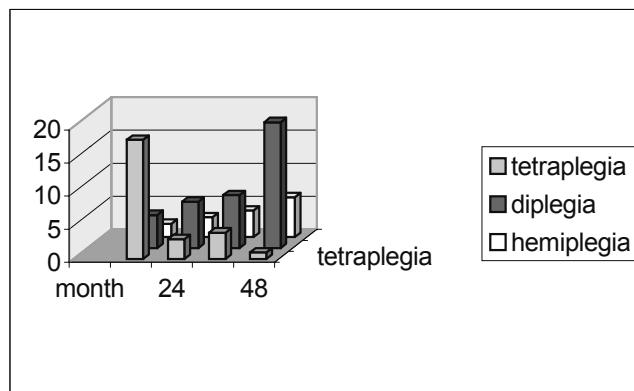


Fig.4 Age of onset of epilepsy.

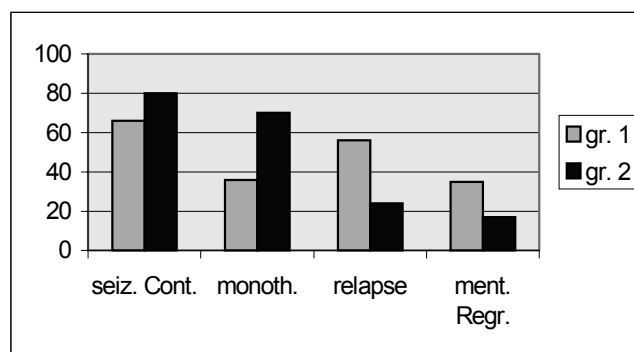


Fig.5 Comparative data of seizure control, monotherapy, relapse rate and mental regression in groups.

Reference

1. Amess P. N., Baudin J., Townsend J., Meek J., et al, Epilepsy in very preterm infants: Neonatal Cranial Ultrasound Reveals High Risk Subcategory, *Developmental Medicine and Child Neurology*, 1998, 40, 724-31.
2. Arts W. F. M., Geerts A. T., Brouwer O. F., Boudewyn Peters A. C., Stroink H., and van Donselaar C. A.: The Early Prognosis of Epilepsy in Childhood: The Prediction of a Poor Outcome. The Dutch Study of Epilepsy in Childhood, *Epilepsia* 1999, 40 (6), 726-34;
3. Gurses C., Gross D., Andermann F., Bastos A., et al, Periventricular leucomalacia and epilepsy, *Neurology*, 1999, 52 (2), 341-46;
4. Hadjipanayis A., Hadjichristodoulos C., Youroukos S., Epilepsy in patients with cerebral palsy, *Developmental Medicine and Child Neurology* 1997, 39 (10), 659-63;
5. Laroia N., Guillet R., Burchfiel J., and McBride M. C.: EEG Background as Predictor of Electrographic Seizures in High-Risk Neonates, *Epilepsia* 1998, 39 (5), 545-51;
6. Miller G, "Cerebral Palsies", New York: Raven, 1992;
7. Moshe S., Dulac O., Intractable seizures in infancy and early childhood, *Neurology*, 1993, 43, suppl. 5 (p. 40);
8. Surveillance of Cerebral Palsy in Europe (SCPE): Prevalence and Characteristics of Children with Cerebral Palsy in Europe, *Developmental Medicine and Child Neurology* 2002, 44 (9), 633-40;

Влияние раннего контроля эпилептических припадков на исход церебрального паралича

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РЕЗЮМЕ

Цель исследования - определить влияние качества контроля эпилепсии на отдалённый исход у пациентов с церебральным параличом (ЦП). Больным с ЦП и эпилепсией проводилось детальное клиническое и ЭЭГ исследование с ранней идентификацией типа припадков и эписиндрома, адекватное лечение и наблюдение за ЭЭГ в процессе физической терапии, вследствие чего осуществлялся более высокий уровень контролируемости припадков, возросла возможность реализации монотерапии и продолжения физической терапии, что значительно улучшило моторные и ментальные функции пациентов.

Ключевые слова: *церебральный паралич, эпилептический синдром, тип припадков, электроэнцефалография, физическая терапия, антиконвульсанты*