

Understanding the mechanisms, identifying and treating prolonged epileptic seizures

The majority of convulsive generalized tonic-clonic seizures terminate prior to two minutes with a small percentage prolonged up to five and occasionally ten minutes.

Which are the factors leading to an occasional seizure prolongation? Which factors involved to seizure termination fail, consequently allowing some of the seizures to continue and develop into status epilepticus? What are the mechanisms involved?

How can children at risk for prolonged seizures can be identified and treated? Can we agree upon an operational definition of prolonged seizures to determine optimal timing of treatment to prevent established status epilepticus?

Understanding of the mechanisms underlying the predisposition for prolonged seizures may lead to improved management pathways. The contributions published in this supplement of *Epileptic Disorders* are the final product of constructive debates held during an international experts workshop devoted to the topic of prolonged seizures, particularly in children, covering:

- Definition of what constitutes a prolonged seizure and how long to delay before administering rescue medication
- Consequences of prolonged seizures on human brain
- Lessons learned from basic science and animal models
- EEG and Neuroimaging aspects
- Benefits and risks from early treatment;
- Overtreatment; Management in children and adults
- A comparison of available treatments, stability in the conditions of emergency, drug absorption and Guidelines for out of hospital management
- Suggestions for future research and clinical trials

The workshop covered all these aspects in detail (see the individual manuscripts) , and at the end, all participants agreed on some clinically very relevant practical guidelines. Intravenous benzodiazepines remain a

first step for the in hospital treatment of prolonged seizures or status epilepticus. However, in the community, in a pre-hospital situation, intravenous administration is not possible. In recent years, it was shown that rectal, buccal, intranasal, and intramuscular administration of benzodiazepines is very effective as a first and safe treatment step. In many cases, rectal diazepam is not socially acceptable anymore.

The prescription of rescue medication remains an individual decision and the question as to whether or not it should be prescribed for an individual patient depends on many factors. All experts agreed upon the fact that the most important risk factor for SE is the history of a previous prolonged event. Therefore, rescue medication is recommended for this subgroup of patients independent of the epilepsy syndrome.

Experts agreed that we certainly need more controlled prospective trials using large consortia with well-defined study criteria and end points. They also agreed upon the fact that translational research needs to be pursued aiming at a better understanding of the underlying pathogenic mechanisms.

All workshop participants insisted that the first need today remains to establish the acceptance of available therapies among those treating children. Rescue medication unavoidably involves parents, family friends and schoolteachers. It remains our responsibility to establish best practices, in close interaction with social scientists, medical professionals and lay organisations.

Currently available evidence allows us to confidently prescribe available rescue drugs when indicated. Once a child is identified as at risk, time for rescue administration has to be determined on an individual basis. The “5 minutes” represent a reasonable, and easy to teach, reference frame. The treating physician, who will also have to take into account the habitual duration of seizures of a patient, can then adapt it and appropriately advise the caregivers. □

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