The Acute Management of Prolonged Febrile Seizures

Source: *Bassan H, Barzilay M, Shinnar S, et al. Prolonged febrile seizures, clinical characteristics, and acute management. Epilepsia. 2013;54(6):1092-1098; doi:10.1111/epi.12164*

PICO

Question: Among children who presented to the ED with a febrile seizure lasting >15 minutes, what prehospital treatments did they receive and how did these impact seizure duration?

Question type: Descriptive

Study design: Case series

Investigators at 4 Israeli medical centers and Albert Einstein College of Medicine in New York sought to determine the clinical characteristics and acute management of children with prolonged febrile seizures (PFS). From January 2008 to March 2010, investigators prospectively collected data on all children who presented to the emergency departments (ED) with PFS, defined as a febrile seizure (FS) lasting >15 minutes. FS was defined as a seizure provoked by a temperature ≥101.0°F, no history of afebrile seizures, and no evidence of acute CNS infection or insult. Data obtained included demographic and past medical history; prehospital and ED management, such as type of medication used; and clinical course, including seizure type, duration, and outcome. Investigators also constructed a logistic regression model to determine predictors of having a PFS >30 minutes.

A total of 60 children with PFS were enrolled, of whom 10% had a history of perinatal complications, 25% had a prior FS, and 18% had a significant neurodevelopmental disorder. The median age was 18.5 months, the median seizure duration was 35 minutes, and the PFS had a focal onset in 57%.

Of the 54 children who were transported to the ED by ambulance, 41 were actively seizing in the ambulance and 33 (61%) were treated in the ambulance (8 were not recognized as actively seizing); 15 (45%) of those treated stopped seizing prior to arrival at the ED. For the children treated in the ambulance, 19 were given IV diazepam or midazolam (median dose 0.16 mg/kg per dose), 9 received rectal diazepam (median dose 0.5 mg/kg per dose) either alone or followed by IV diazepam or midazolam, and 5 were given intramuscular or intranasal midazolam. Children receiving rectal diazepam first were less likely to stop seizing (n=1 of 9) compared with those who received IV diazepam or midazolam first (n=11 of 19; $P = .02$).

Upon arrival in the ED, 31 (52%) children were still seizing. Lumbar puncture was performed in 12 patients (20%). EEG was performed in 37 children and was abnormal in 17. A total of 38 (63%) children were admitted. Independent predictors of a PFS lasting >30 minutes included intermittent seizure type ($P = .02$) and failure to respond to initial treatment with rectal diazepam ($P = .001$).

The investigators conclude that although most children with PFS received anti-epileptic treatment in the prehospital setting, this treatment was effective in ending the seizure prior to arrival in the ED in only a minority of cases.

Commentary by

J. Gordon Millichap, MD, FAAP, Neurology, Ann & Robert H. Lurie Children's Hospital of Chicago, Northwestern University Feinberg School of Medicine, Chicago, IL

Dr Millichap has disclosed no financial relationship relevant to this commentary. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.

A PFS, as defined in this study, is a subtype of the complex FS lasting >15 minutes. Recent data suggest that 10 minutes may be a more appropriate cutoff between the simple and complex FS.[1] A PFS lasting >30 minutes is classified as febrile status epilepticus (FSE), accounting for 5% to 9% of FS patients.[2] PFS and FSE may be associated with hippocampal injury, subsequent mesial temporal sclerosis, and temporal lobe epilepsy.[3,4] In light of the increased risk of subsequent epilepsy, the acute management and prevention of PFS and FSE become highly important.

The ineffectiveness of rectal diazepam in management of PFS reported in this study is consistent with findings in a United Kingdom study, in which investigators found that the control of status epilepticus with intravenous lorazepam was significantly superior to that with rectal diazepam.[5] In contrast, a retrospective analysis of ambulance-transported children in a large urban emergency medical service in San Francisco found rectal diazepam to be a simple, effective, and safe method of prehospital management of pediatric status epilepticus.[6] Compared with IV diazepam, rectal diazepam is easier to administer, especially in infants and toddlers, and is less likely to produce respiratory depression. Short duration of action is an important limitation of both treatments. In the San Francisco study, seizures were controlled in 13 of 16 children (81%) who received rectal diazepam in a single dose ranging from 0.16 to 0.57 mg/kg and in all of 15 treated with IV diazepam, 0.04 to 0.33 mg/kg. Convulsions recurred before arrival at the ED in 4 of the 13 (30.8%) treated with rectal diazepam in the ambulance and in 9 of 15 (60%) who received IV diazepam. Prehospital endotracheal intubation for profound respiratory depression was required in 2 children treated with IV diazepam and in none treated with rectal diazepam. As such, the optimal prehospital management of PFS remains incompletely determined.

References

1. Hesdorffer DC, et al. *Ann Neurol.* 2011;70(S15):93-100; doi:10.1002/ana.22582
2. Berg AT, et al. *Epilepsia.* 1996;37(2):126-133; doi:10.1111/j.1528-1157.1996.tb00003.x
3. Hesdorffer DC, et al. *Epilepsia.* 2012;53(9):1471-1480; doi:10.1111/j.1528-1167.2012.03567.x
4. Shinnar S, et al. *Neurology.* 2012;79(9):871-877; doi:10.1212/WNL.ob013e318266fcc5
5. Chin RF, et al. *Lancet Neurol.* 2008;7(8):696-703; doi:10.1016/S1474-4422(08)70141-d
6. Dieckmann RA. *Ann Emerg Med.* 1994;23(2):216-224; doi:10.1016/S0196-0644(94)70034-6

Key words: febrile seizures, status epilepticus, benzodiazepines

Visit www.GrandRoundsBlog.org to read a post about this article appearing this month.

The Acute Management of Prolonged Febrile Seizures

AAP Grand Rounds 2013;30;34
DOI: 10.1542/gr.30-3-34

The Acute Management of Prolonged Febrile Seizures

AAP Grand Rounds 2013;30;34
DOI: 10.1542/gr.30-3-34