

[MUSIC PLAYING]

**MICHAEL KOHRMAN, MD:** Thank you for joining me this afternoon. My name is Michael Kohrman. I am the professor of pediatrics, neurology, and surgery at the University of Chicago. And I direct the pediatric epilepsy program at the Comer Children's Hospital.

I'd like to talk to you today about the most common form of seizures that we see. And those are febrile seizures. As you probably know, febrile seizures occur in about the 3% to 5% of children. The vast majority are what we call simple febrile seizures. But there can also be complex febrile seizures. And in those patients with epilepsy, we may see seizures associated with fever.

So a simple febrile seizure is a seizure that is generalized, meaning both sides of the body are shaking rhythmically. It lasts less than 20 minutes in duration. It's a single event. The child has a normal examination prior to the seizure. They have a normal examination after the seizure. And there's no history of previous seizures unassociated with fever.

The definition of a complex febrile seizure is just the opposite. They can be focal, meaning one side of the body may shake or jerk. There may be multiple events in a 24-hour period. And they often have an abnormal examination prior to their seizure.

The definition of seizure with fever is basically a patient who has a previous history of afebrile seizures. And these seizures then may be focal or generalized in association with fever. So as I said earlier, 3% to 5% of children will have simple febrile seizures. Typically they occur between six months and six years of age. About a third of the patients will have a recurrence. And of those third, who have a second febrile seizure, somewhere between a third and a half will have an additional event.

The risk of epilepsy with a simple febrile seizure during lifetime is about 3 and 1/2%. The normal risk of epilepsy is about 1% to 2%. So a slight increase, but certainly not significant.

So why do children have simple febrile seizures? Well overall, the fever, we know, lowers seizure threshold. We know that younger children tend to have higher fevers. And young children seem to have lower seizure threshold than older children and adults. So we don't typically see as many seizures with the same temperature in older folks that we do with the younger kids.

Febrile seizures are associated with the rate of rise of the fever, and not necessarily the maximum temperature. So it's often the child will have the seizure itself before it's even recognized that they have a fever, or they're sick. So complex febrile seizures-- by definition, a seizure that lasts longer than 20 minutes, is status epilepticus. It should always be treated as status epilepticus. It is my belief that a patient should always be discharged from the hospital, and add a convulsive medicine any time there's an episode of status epilepticus.

If a patient has one complex factor, their risk of epilepsy rises to about 5%. With two complex factors, that risk rises to 8%. With three complex factors, that risk of epilepsy rises to about 27%.

Despite those risk factors, we know that treatment, in and of itself, with epilepsy with anticonvulsants doesn't prevent the formation of epilepsy. It will treat seizures. And it's a complex concept, but anticonvulsants treat seizures. They don't prevent epilepsy.

So I was fortunate enough to participate on the American Academy of Pediatrics guidelines group for the work-up and treatment of febrile seizures. And we reviewed the literature. And those guidelines are well-described in the American Academy and the Journal of Pediatrics.

The work-up should be directed at finding the cause of a fever. If no cause of a fever can be found in children six months or younger, than an LP should be performed. It's important to recognize that the longer the duration of fever, the more likely a child is to have a central nervous system infection.

So a child whose first symptom of fever is that simple febrile seizure, typically is the child that I am least worried about in the emergency room. The child who has a fever for three or four days and then has their seizure with that fever of 104-- that's the child I'm worried about, and meningitis. Want to make sure they don't have a stiff neck, they don't have a Kernig's or Brzezinski sign. And that's the child that I'm going to make sure I find a source of their fever. Or I'm going to do a lumbar puncture.

There is no other work-up recommended, other than looking for the cause of the fever. We found, in review of the literature, that CBC is not predictive of epilepsy. It's useful for the cause of the fever. A CT scan is not predictive, with abnormal results occurring in less than half a percent of patients. And that abnormal finding is typically not the cause of a seizure. None of these tests were recommended.

Unnecessary CT scanning for simple febrile seizures were estimated to cost over \$1,000,000,000 a year. And that was in 1996 dollars. You can probably triple that today.

So we also create guidelines for the treatment of a simple febrile procedure. The treatment of the cause and symptoms of fever is recommended. No treatment of the seizure, unless the patient is in status epilepticus, is recommended. No prophylactic treatment is recommended for the treatment of a simple febrile seizure.

And reassurance of the family is the primary treatment. As I said earlier, the risk of epilepsy is essentially not much greater than that of the background incidence of epilepsy. And I think it's safe to reassure the patient's parents that these children are no more likely than an average child to develop epilepsy over the course of their lifetime.

A rectal Diazepam can be prescribed for a family to use if a repeat seizure occurs that lasts more than five minutes. Family should always call emergency medical services if a Diazepam is given. Drugs that are effective for seizures associated with fever include Phenobarbital and Valproic acid. And there has been one study using high-dose Diazepam at the onset of fever in children who have recurrent febrile seizures with success as well.

In terms of treatment of complex febrile seizures, the source of fever should be identified and treated appropriately, as in a simple febrile seizure. If there's focality of a seizure or neurologic exam, imaging of the brain should be performed. A CT scan, if there's concern acutely about blood. Quickly obtained, an MRI scan provides better information about the structural abnormalities of the brain, especially in patients with focal neurologic exams. An EEG is indicated if there's focality associated with the seizure, or status epilepticus occurs.

As we talked about, seizures with fever, they are typically in patients who already have been diagnosed with epilepsy. Again, fever lowers threshold in all of our patients. And those with epilepsy, this is an added risk.

The work-up should be targeted, again, at the cause of the fever. If focality is a new finding, then an image of the brain should be obtained. Effective anticonvulsants, as we said earlier, for seizures associated with fever include Phenobarbital or Valproic acid.

So in conclusion, I'd like to ask you to reassure the parents and children who do have simple febrile seizures that it's unlikely that they're going to develop epilepsy. That these seizures don't cause injury to the brain. And that a watch and waitful approach is appropriate.

The work-up for febrile seizures should always be aimed at localizing the source of fever. A focality of a seizure, or examination, defines complexity. And an image of the brain should be obtained. For simple febrile seizures, reassurance is the primary therapy for the child and the parents Thank you.