

**DEREK** Hello, I'm Derek Johnson. I'm a neurologist at Mayo Clinic.

**JOHNSON:**

**BRIAN O'NEILL:** And I'm Brian O'Neill. I'm also a neurologist at Mayo Clinic. I'm the division director of neuro-oncology and lead the program in the Mayo Clinic Cancer Center.

**DEREK** Well, one of the things we do at Mayo Clinic is take care of many patients with brain tumors, from time of diagnosis throughout the course of their disease. And an area of interest to me is improving the patient's quality of life and looking at causes of hospitalization, because hospitalization in patients with a known diagnosis of malignant brain tumor-- it's certainly bad for patients. It's bad for their families. It's a great cause of stress, anxiety, and general disarray.

And from an economic standpoint, it's very expensive, both personal costs from the patient and cost to society. So what we wanted to do is look at causes of hospitalization in this patient population with malignant brain tumors to see if there were any subsets of hospitalization that were potentially preventable, which would be, again, good for patients and payers at large. And as an initial step to thinking about how we can change some of these hospitalization patterns.

So what we did was looked at an outpatient hospitalization database from the state of California. Between 2003 and 2009, essentially everyone that's hospitalized in that state goes into a large database. And you can look and identify people that had malignant brain tumors and then go back and figure out why they were hospitalized, how long the hospitalization was, and what it cost.

When we looked at the cost of hospitalization, by far the most common reason for hospitalization was seizure. And this is an expected complication in this population. Many patients with brain tumors present as seizure as their initial symptom. And even patients that don't have seizure as an initial symptom will often develop it over the course of the disease. So this wasn't by any means a surprise that it was a major cause of hospitalization, but I think the absolute numbers were somewhat surprising.

--course of this period from 2003 to 2009, over 2,500 patients in the state of California were admitted with brain tumor for seizure activity. And people have looked at this in the past in terms of how we might better prevent seizures like this from happening. To date, using medications to prevent seizures in people who've never had a seizure has not been an effective strategy. But there is hope for future trials using newer generations of agent that may be more difficult for a physician, or maybe easier for physicians to manage and decrease these hospitalization rates.

It does point out that as a medical system, we need to be vigilant for seizures in this population and hopefully treat them aggressively when they occur to prevent patients from having to be hospitalized for this reason. A similar comment can be made about deep venous thrombosis. It's a very common, common in patients with tumors of all kinds, including brain tumors. And it was a significant cause of hospitalization in this study population. That's something that, in an ideal world, can be identified early and hopefully treated as an outpatient before a serious complication needing hospitalization.

And again, it's not about not aggressively treating these population. It's the opposite of that. It's about aggressively treating them and managing them as an outpatient to prevent this end-stage hospitalization from happening.

**BRIAN O'NEILL:** I think one of the other interesting things that comes out of this is that we all strive for data-driven practice care, but sometimes the data upon which the practice of care is based is either older data or data that needs to be re-examined with either newer practice pattern or newer medications. And I think that's the other thing, is that a pattern of practice regarding use of anticonvulsants in patients with brain tumors who haven't had seizures may need to be re-examined as there's better drugs, better tolerated drugs. And this might make a case for reopening that study of whether anticonvulsants should be used in patients with brain tumors.

**DEREK JOHNSON:** The other group of hospitalizations identified were hospitalizations for innate complications of disease, things like dehydration, encephalopathy, increased intracranial pressure, that are expected outcomes late in the course of disease. And as I was saying, despite aggressive care, most of these patients will pass away within two years of diagnosis. And for physicians to know that and for patients and physicians to identify the preferences for care at the end of life early on, because time and time again, when you ask Americans in what sense-- how they want to be treated near the end of their life, people wish to avoid hospitalization.

They want to spend time in their homes with their families and maintain as much dignity and peace as possible. And I think that changing our practice of care a little bit and thinking about that possibility early on and involving patients in the discussion, again, will help prevent some of these late hospitalizations. And that will be good for patients and a significant savings cost as well.